

Statistics I in English
Exercises from *Übungsaufgaben und Lösungen zu Statistik I und II*
Part 3

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Exercise 3-10

25 Students of the University X in X-town were asked in June 1994 about their Studies, their number of brothers and sisters (siblings) and their income. The outcome was as follows:

i	Name	Studies	Brothers and Sisters	Income
1	Martin A.	Economics	0	924
2	Ute A.	Social Sc.	1	789
3	Wilhem A.	Business	0	1365
4	Kurt B.	Business	1	683
5	Syvia B.	Political Sc.	1	744
6	Elke D.	Political Sc.	2	640
7	Klaus D.	Social Sc.	2	631
8	Theo E.	Economics	1	814
9	Jean F.	Political Sc.	1	778
10	Elvira G.	Business	0	1062
11	Karl H.	Business	0	1230
12	Andreas K.	Economics	1	700
13	Thomas K.	Business	0	850
14	Chris L.	Social Sc.	3	641
15	Uwe L.	Political Sc.	2	640
16	Axel M.	Business	0	850
17	Maria M.	Business	1	683
18	Ruth M.	Social Sc.	0	616
19	Bärbel N.	Business	1	683
20	Armin R.	Business	2	683
21	Christa R.	Economics	1	660
22	Bernd S.	Business	1	1440
23	Claudia S.	Social Sc.	3	794
24	Eeur T.	Economics	0	660
25	Claudia W.	Political Sc.	1	640

- a) What is the statistical entirety and what are the single statistical items of this poll? What characteristics of identification can you define?
- b) How is the category “Studies” scaled? Calculate the absolute and the relative frequency of this criterion. Draw a graph of the frequency distribution.

- c) How is the criterion “Brothers and Sisters” scaled? Calculate the absolute and the relative frequency of this category. Calculate the absolute and the relative empirical distribution function. Draw a graph of the frequency distribution and of the empirical distribution function.
- d) How many students have at most two siblings?
- e) What percentage of the students has at least two sisters or brothers?
- f) What percentage of the students has one or two brothers or sisters?
- g) How is the category “income” scaled? Calculate the absolute and the relative frequency distribution of this category by using the following income groups (from... to...): 600-650, 650-700, 700-900, 900-1200, 1200-1450. Calculate the absolute and the relative empirical distribution function. Draw graph of the frequency distribution and of the empirical distribution function.
- h) Calculate with respect to the distribution of the income from g)
- What percentage of the students has an income between 750 and 1300 €?
 - What percentage of the students has an income of more than 800 €?
 - What is the highest income of the 50% of the students with the lowest income?
 - What is the smallest income of the 20% of the students with the highest income?

Exercise 3-13

Student Alois owns a strawberry plantation in Bavaria to finance his studies. As the harvest varies with the “Quality of the summer”, Alois makes notes of how many hours per day the sun shines on his fields in the season.

Hours of sunshine per day, from...to...	Number of days
0 – 2	20
2 – 3	15
3 – 5	20
5 – 8	35
8 - 12	10

From the Analysis of this data, he hopes to find out what to expect from the harvest:

- a) What is the analysed statistical criterion and how is it scaled?
- b) Draw a graph of the frequencies from the table.
- c) Draw the empirical distribution function.
- d) How many days did the sun shine for more than 4 hours this season?

- e) How long did the sun shine at most, during the 40 days with the least hours of sunshine?
- f) On which percentages of days did the sun shine between 4 and 9 hours this season?

Exercise 3-20

With respect to Exercise 3-10

- a) Calculate an appropriate mean for the category X: “Studies”.

Exercise 3-22

Mr. Meier owns a garden dwarfs wholesale business with three branches in: Berlin, New York and Flensburg. At the end of the year, he wants to get an overview of the business situation and therefore asks all of the three branches for information about the orders that have income during the year.

His Berlin branch submitted following information:

Value of order in Euro from...to...	Number of orders
0 – 20 000	15
20 000 – 50 000	30
50 000 – 150 000	45
150 000 – 300 000	10

- a) What is the analysed statistical criterion? How is it scaled?
- b) Which statistical items has the criterion been collected from?
- c) Calculate the average value of order.

Exercise 3-26:

The director of a bank wants to get information about the daily journey of his employees to work. Upon request, the personnel office sends him the following table.

Lengths of journey (km)	Number of employees
0 – 1	7
1 – 5	24
5 – 15	35
15 – 30	18
30 – 50	16

- a) What are the statistical items and what is the analysed statistical criterion?
How is the criterion scaled?
- b) Calculate the relative frequency distribution and the absolute and relative empirical distribution function. Draw a graph of the frequency distribution and of the empirical distribution function.
- c) Calculate the average lengths of the journeys.
- d) Which journey length is the most often travelled?
- e) Which journey length is respectively in the middle, where 50% of employees have a shorter distance and 50% have a longer distance.
- f) Calculate the following p-quantiles of the journey lengths for p: 0,05; 0,25; 0,75; 0,9.