

Engineering Mathematics II (ED 121)

Homework 6

Release Date: 23.02.2024

Due Date: 1.03.2024

1. The following data set represents the scores on intelligence quotient (IQ) examinations of 40 sixth-grade students at a particular school: 114, 122, 103, 118, 99, 105, 134, 125, 117, 106, 109, 104, 111, 127, 133, 111, 117, 103, 120, 98, 100, 130, 141, 119, 128, 106, 109, 115, 113, 121, 100, 130, 125, 117, 119, 113, 104, 108, 110, 102.
 - (a) Present this data set in a frequency histogram.
 - (b) Which class interval contains the greatest number of data values?
 - (c) Is there a roughly equal number of data in each class interval?
 - (d) Does the histogram appear to be approximately symmetric? If so, about which interval is it approximately symmetric?
2. The following data (in thousands of dollars) represent the net annual income for a sample of taxpayers: 47, 55, 18, 24, 27, 41, 50, 38, 33, 29, 15, 77, 64, 22, 19, 35, 39, 41, 67, 55, 121, 77, 80, 34, 41, 48, 60, 30, 22, 28, 84, 55, 26, 105, 62, 30, 17, 23, 31, 28, 56, 64, 88, 104, 115, 39, 25, 18, 21, 30, 57, 40, 38, 29, 19, 46, 40, 49, 72, 70, 37, 39, 18, 22, 29, 52, 94, 86, 23, 36
 - (a) Graph this data set in a frequency histogram having 5 class intervals.
 - (b) Graph this data set in a frequency histogram having 10 class intervals.
 - (c) Which histogram do you think is more informative? Why?
3. The following data represent the acidity of 40 successive rainfalls in the state of Minnesota. The acidity is measured on a pH scale, which varies from 1 (very acidic) to 7 (neutral).
3.71, 4.23, 4.16, 2.98, 3.23, 4.67, 3.99, 5.04, 4.55, 3.24, 2.80, 3.44, 3.27, 2.66, 2.95, 4.70, 5.12, 3.77, 3.12, 2.38, 4.57, 3.88, 2.97, 3.70, 2.53, 2.67, 4.12, 4.80, 3.55, 3.86, 2.51, 3.33, 3.85, 2.35, 3.12, 4.39, 5.09, 3.38, 2.73, 3.07
 - (a) Find the sample mean, median, standard deviation.
 - (b) Find the range.
 - (c) Find the interquartile range.
4. The following data give the injury rates per 100,000 worker-hours for a sample of 20 semiconductor firms: 1.4, 2.4, 3.7, 3.1, 2.0, 1.9, 2.5, 2.8, 2.2, 1.7, 3.1, 4.0, 2.2, 1.8, 2.6, 3.6, 2.9, 3.3, 2.0, 2.4
 - (a) Plot the data in a histogram.
 - (b) Is the data set roughly symmetric?
 - (c) If the answer to (b) is no, is it skewed to the left or to the right?
 - (d) If the answer to (b) is yes, is it approximately normal?
5. The following represent the times (in minutes) it took 22 newly hired workers to complete a standardized task: 166, 82, 175, 181, 169, 177, 180, 185, 159, 164, 170, 149, 188, 173, 170, 164,

158, 177, 173, 175, 190, 172

- Find the sample mean.
- Find the sample median.
- Plot the data in a histogram.
- Is this data set approximately normal?

6. The following data were obtained in a study of the relationship between the weight and chest size of infants at birth:

x , weight in kg	2.76	2.17	5.53	4.31	2.30	3.70
y , chest size in cm	29.5	26.3	36.6	27.8	28.3	28.6

Determine the sample correlation coefficient r .

7. The following data refer to the number of adults in prison and on parole in 12 midwestern states. The data are in thousands of adults.

State	In prison	On parole
Illinois	18.63	11.42
Indiana	9.90	2.80
Iowa	2.83	1.97
Kansas	4.73	2.28
Michigan	17.80	6.64
Minnesota	2.34	1.36
Missouri	9.92	4.53
Nebraska	1.81	0.36
North Dakota	0.42	0.17
Ohio	20.86	6.51
South Dakota	1.05	0.42
Wisconsin	5.44	3.85

- Draw a scatter diagram.
- Determine the sample correlation coefficient between the number of adults in state prison and on parole in that state.
- Fill in the missing word. States having a large prison population tend to have a(n)— number of individuals on parole.

8. Construct a box plot for the following data set. 3,5,8,8,9,11,12,12,13,13,16