Statistics: Exercise 14.2

Q.1 The blood groups of 30 students of Class - VII are recorded as follows:
A, B, O, O, AB, O, A, O, B, A, O, B, A, O, O
A, AB, O, A, A, O, O, AB, B, A, O, B, A, B, O
Represent this data in the form of a frequency distribution table. Which is the most common and which is the rarest blood group among these students?
Sol. Frequency distribution table:

Blood group	Number of students
A	9
B	6
O	12
AB	3
Total	30

From the table, most common Blood group: O,
And rarest Blood group: AB.

Q.2 The distance (in km) of 40 engineers from their residence to their place of work were found as follows:

5	3	10	20	25	11	13	7	12	31
19	10	12	17	18	11	32	17	16	2
7	9	7	8	3	5	12	15	18	3
12	14	2	9	6	15	15	7	6	12

Construct a grouped frequency distribution table with class size 5 for the data given above, taking the first interval as 0−5 (5 not included). What main features do you observe from this tabular representation?

***Sol.* Given:** First class interval = (0 - 5) (5 not included) and class size is 5.
Since, in given data minimum and maximum km are 2 and 32 respectively.
Therefore, the classes of equal size are: 0– 5, 5 – 10, 10 – 15, 15 – 20, 20– 25, 25 – 30 and 30 – 35.
Thus, the frequency distribution table:

Distances (in km)	Tally Marks	Frequency
0 – 5	𝍸𝍸	5
5 – 10	𝍸𝍸 𝍸𝍸 l	11
10 – 15	𝍸𝍸 𝍸𝍸 l	11
15 – 20	𝍸𝍸 llll	9
20 – 25	l	1
25 – 30	l	1
30 – 35	ll	2
Total		40

From the table, upper limit of a class is not included in the class. So, the distance traveled by the engineer to his place of work, an engineer who has to travel 5 km is not included in this class. He will be counted in the next class of (5 – 10). This is known an exclusive method.
It is observed that 27 engineers out of 40 lives at a distance less than 15 km from their residence.

Q.3 The relative humidity (in %) of a certain city a for month of 30 days was as follows :

98.1	98.6	99.2	90.3	86.5	95.3	92.9	96.3	94.2	95.1
89.2	92.3	97.1	93.5	92.7	95.1	97.2	93.3	95.2	97.3
96.2	92.1	84.9	90.2	95.7	98.3	97.3	96.1	92.1	89

(i) Construct a grouped frequency distribution table with classes 84 - 86, 86 - 88, etc.
(ii) Which month or season do you think this data is about
(iii) What is the range of this data?

Sol. **(i)** Since, in given data, minimum and maximum relative humidity (in percentage) are 84.9 and 99.2 respectively. And given that 84 - 86 is one of the class intervals with same size of 2. So, the classes of equal size are:

84 - 86, 86 - 88, 88 - 90............ 98 -100.

Therefore, frequency distribution table:

Relative Humidity (in %)	Frequency
84 – 86	1
86 – 88	1
88 – 90	2
90 – 92	2
92 – 94	7
94 – 96	6
96 – 98	7
98 – 100	4
Total	30

(ii) The given data seems to be taken in the rainy season because the relative humidity is high.

(iii) The range of given data = Maximum value – minimum value

= 99.2 – 84.9

= 14.3

Q.4 The heights of 50 students, measured to the nearest centimeter, have been found to be as follows:

161	150	154	165	168	161	154	162	150	151
162	164	171	165	158	154	156	172	160	170
153	159	161	170	162	165	166	168	165	164
154	152	153	156	158	162	160	161	173	166
161	159	162	167	168	159	158	153	154	159

(i) Represent the data given above by a grouped frequency distribution table, taking the class intervals as

160 - 165, 165 - 170, etc.

(ii) What can you conclude about their heights from the table?

Sol. **(i)** Since, in given data, minimum and maximum heights are 150 cm and 173 cm respectively. And given that 160 – 165 is one of the class intervals with same size of 5. So, the classes of equal size are: 150 - 155, 155 - 160....., 170 - 175.

Therefore, frequency distribution table:

Heights (in cm)	Frequency
150 – 155	12
155 – 160	9
160 – 165	14
165 – 170	10
170 – 175	5
Total	50

(ii) From the table, we can conclude that more than 50% of students are shorter than 165 cm.

Q.5 A study was conducted to find out the concentration of Sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is as follows :

0.03	0.08	0.08	0.09	0.04	0.17
0.16	0.05	0.02	0.06	0.18	0.20
0.11	0.08	0.12	0.13	0.22	0.07
0.08	0.01	0.10	0.06	0.09	0.18
0.11	0.07	0.05	0.07	0.01	0.04

(i) Make a grouped frequency distribution table for this data with class intervals as 0.00 - 0.04, 0.04 - 0.08, and so on.
(ii) For how many days, was the concentration of Sulphur dioxide more than 0.11 parts per million?

Sol. (i) Since, in given data minimum and maximum concentration of Sulphur dioxide in the air are 0.01 and 0.22 respectively. And also given that 0.00- 0.04 is one of the class intervals with same size of 0.02. So, the classes of equal size are:
0.00 – 0.04, 0.04 – 0.08... 0.20 – 0.24
Therefore, frequency distribution table:

Concentration of Sulphur dioxide (in ppm)	Frequency
0.00 – 0.04	4
0.04 – 0.08	9
0.08 – 0.12	9
0.12 – 0.16	2
0.16 – 0.20	4
0.20 – 0.24	2
Total	30

(ii) From the table, concentration of Sulphur dioxide was more than 0.11 ppm for 8 days.

Q.6 Three coins were tossed 30 times. Each time the number of heads occurring was noted down as follows:

0	1	2	2	1	2	3	1	3	0
1	3	1	1	2	2	0	1	2	1
3	0	0	1	1	2	3	2	2	0

Prepare a frequency distribution table for the data given above.

Sol. Frequency distribution table:

Number of heads	Frequency
0	6
1	10
2	9
3-	5
Total	30

Q.7 The value of π up to 50 decimal places is given below:
        3.14159265358979323846264338327950288419716939937510.
(i) Make a frequency distribution of the digits from 0 to 9 after the decimal point.
(ii) What are the most and the least frequently occurring digits?

Sol. (i) Frequency distribution table:

Digits	Frequency
0	2
1	5
2	5
3	8
4	4
5	5
6	4
7	4
8	5
9	8
Total	50

(ii) From the table, the most frequently occurring digits are 3 and 9 and the least occurring is 0.

Q.8 Thirty children were asked about the number of hours they watched TV programmes in the previous week. The results were found as follows:

1	6	2	3	5	12	5	8	4	8
10	3	4	12	2	8	15	1	17	6
3	2	8	5	9	6	8	7	14	12

(i) Make a grouped frequency distribution table for this data, taking class width 5 and one of the class intervals as 5 – 10.
(ii) How many children watched television for 15 or more hours a week?

Sol. (i) Since in given data, minimum and maximum number of hours children watched TV programmes in

the previous week are 1 hour and 17 hours respectively. And also given that 5 – 10 is one of the class intervals with same size of 5. So, the classes of equal size are: 0 –5, 5–10, 10–15 and 15–20.
Therefore, frequency distribution table:

Number of heads	Frequency
0 – 5	10
5 – 10	13
10 – 15	5
15 – 20	2
Total	30

(ii) From the frequency distribution table, two children watched television for 15 or more hours a week.

Q.9 A company manufactures car batteries of a particular type. The lives (in years) of 40 such batteries were recorded as follows:

2.6	3.0	3.7	3.2	2.2	4.1	3.5	4.5
3.5	2.3	3.2	3.4	3.8	3.2	4.6	3.7
2.5	4.4	3.4	3.3	2.9	3.0	4.3	2.8
3.5	3.2	3.9	3.2	3.2	3.1	3.7	3.4
4.6	3.8	3.2	2.6	3.5	4.2	2.9	3.6

Construct a grouped frequency distribution table for this data, using class intervals of size 0.5 starting from the interval (2 – 2.5).

Sol. Since in given data, minimum and maximum life in number of years of car batteries are 2.2 years and 4.6 years. And also given that 2 – 2.5 is one of the class interval with same size of 0.5. So, the classes of equal size are:
2.0 - 2.5, 2.5 - 3.0, 3.0 - 3.5... 4.5 – 5.0.
Therefore, frequency distribution table:

Life of batteries (in years)	Frequency
2.0 – 2.5	2
2.5 – 3.0	6
3.0 – 3.5	14
3.5 – 4.0	11
4.0 – 4.5	4
4.5 – 5.0	3
Total	30