Exercise 18(A)

1. State which of the following variables are continuous and which are discrete:
(a) Number of children in your class
(b) Distance travelled by a car
(c) Sizes of shoes
(d) Time
(e) Number of patients in a hospital
Solution:

(a) Discrete variable.
(b) Continuous variable.
(c) Discrete variable.
(d) Continuous variable.
(e) Discrete variable.

2. Given below are the marks obtained by 30 students in an examination:

08	17	33	41	47	23	20	34
09	18	42	14	30	19	29	11
36	48	40	24	22	02	16	21
15	32	47	44	33	01		

Taking class intervals 1 - 10, 11 - 20,....., 41 - 50; make a frequency table for the above distribution.
Solution:

The frequency table for the given distribution is

Marks	Tally Marks	Frequency
1 - 10	||||	4
11 - 20	$\cancel{\|\|\|\|}$ |||	8
21 - 30	$\cancel{\|\|\|\|}$ |	6
31 - 40	$\cancel{\|\|\|\|}$ |	6
41 - 50	$\cancel{\|\|\|\|}$ |	6

3. The marks of 24 candidates in the subject mathematics are given below:

45	48	15	23	30	35	40	11
29	0	3	12	48	50	18	30
15	30	11	42	23	2	3	44

The maximum marks are 50. Make a frequency distribution taking class intervals 0 - 10, 10-20, ...
Solution:

The frequency table for the given distribution is

Marks	Tally Marks	Frequency

0 – 10	||||	4
10 – 20	𝍸 |	6
20 – 30	|||	3
30 – 40	||||	4
40 – 50	𝍸 ||	7

In the above frequency distribution, the marks 30 are present in the class of interval 30 - 40 and not in the interval 20 - 30. Similarly, marks 40 are present in the class of interval 40 - 50 and not in 30 - 40.

4. Fill in the blanks:
(a) A quantity which can very from one individual to another is called a .....
(b) Sizes of shoes are ..... variables.
(c) Daily temperatures is..... variable.
(d) The range of the data 7, 13, 6, 25, 18, 20, 16 is .....
(e) In the class interval 35 - 46; the lower limit is ..... and upper limit is .....
(f) The class mark of class interval 22 - 29 is ..... .
Solution:

(a) Variable.
(b) Discrete variables.
(c) Continuous variable.
(d) The range is 25 – 6 = 19
(e) Lower limit is 35 and upper limit is 46
(f) The class mark is 22 – 29 = (22 + 29)/2
= 51/2
= 25.5

5. Find the actual lower class limits, upper class limits and the mid-values of the classes: 10 - 19, 20 - 29, 30 - 39 and 40 - 49.
Solution:

For the class interval: 10 – 19,
Lower class limit is 10
Upper class limit is 19
So, the mid-value is (10 + 19)/2 = 14.5

For the class interval: 20 – 29,
Lower class limit is 20
Upper class limit is 29
So, the mid-value is (20 + 29)/2 = 24.5

For the class interval: 30 – 39,
Lower class limit is 30

Upper class limit is 39
So, the mid-value is (30 + 39)/2 = 34.5

For the class interval: 40 – 49,
Lower class limit is 40
Upper class limit is 49
So, the mid-value is (40 + 49)/2 = 44.5

6. Find the actual lower and upper class limits and also the class marks of the classes: 1.1 - 2.0, 2.1 -3.0 and 3.1 - 4.0.
Solution:

For the class interval: 1.1 - 2.0,
The lower class limit is 1.1 and the upper class limit is 2.0
Hence, the class mark is (1.1 + 2.0)/2 = 1.55

For the class interval: 2.1 - 3.0
The lower class limit is 2.1 and the upper class limit is 3.0
Hence, the class mark is (2.1 + 3.0)/2 = 2.55

For the class interval: 3.1 - 4.0
The lower class limit is 3.1 and the upper class limit is 4.0
Hence, the class mark is (3.1 + 4.0)/2 = 3.55

7. Use the table given below to find:
(a) The actual class limits of the fourth class.
(b) The class boundaries of the sixth class.
(c) The class mark of the third class.
(d) The upper and lower limits of the fifth class.
(e) The size of the third class.

Class Interval	Frequency
30 - 34	7
35 - 39	10
40 - 44	12
45 - 49	13
50 - 54	8
55 - 59	4

Solution:

(a) The actual class limits of the fourth class will be: 44.5 - 49.5.
(b) The class boundaries of the sixth class will be: 54.5 - 59.5
(c) The class mark of the third class will be the average of the lower limit and the upper limit of the class interval
Hence, the class mark is (40 + 44)/2 = 84/2 = 42
(d) The upper and lower limits of the fifth class are 54 and 50 respectively

(e) The size of the third class is (44 - 40 + 1) = 5

8. Construct a cumulative frequency distribution table from the frequency table given below:

(i)

Class Interval	Frequency
0 - 8	9
8 - 16	13
16 - 24	12
24 - 32	7
32 - 40	15

(ii)

Class Interval	Frequency
1 - 10	12
11 - 20	18
21 - 30	23
31 - 40	15
41 - 50	10

Solution:

(i) The cumulative frequency distribution table is

Class Interval	Cumulative Frequency
0 - 8	9
8 - 16	22
16 - 24	34
24 - 32	41
32 - 40	56

(ii) The cumulative frequency distribution table is

Class Interval	Cumulative Frequency
1 - 10	12
11 - 20	30
21 - 30	53
31 - 40	68
41 - 50	78

9. Construct a frequency distribution table from the following cumulative frequency distribution:

(i)

Class Interval	Cumulative Frequency
10 - 19	8

20 - 29	**19**
30 - 39	**23**
40 - 49	**30**

(ii)

Class Interval	**Cumulative Frequency**
5 - 10	**18**
10 - 15	**30**
15 - 20	**46**
20 - 25	**73**
25 - 30	**90**

Solution:

(i) The frequency distribution table is as below:

Class Interval	Frequency
10 - 19	8
20 - 29	11
30 - 39	4
40 - 49	7

(ii) The frequency distribution table is as below:

Class Interval	Frequency
5 - 10	18
10 - 15	12
15 - 20	16
20 - 25	27
25 - 30	17

10. Construct a frequency table from the following data:

Marks	**No. of students**
less than 10	**6**
less than 20	**15**
less than 30	**30**
less than 40	**39**
less than 50	**53**
less than 60	**70**

Solution:

The frequency table is as below:

Class Interval	No. of students
0 - 10	6
10 - 20	9
20 - 30	15

30 - 40	9
40 - 50	14
50 - 60	17

11. Construct the frequency distribution table from the following cumulative frequency table:

Ages	**No. of students**
Below 4	**0**
Below 7	**85**
Below 10	**140**
Below 13	**243**
Below 16	**300**

(i)

State the number of students in the age group 10 - 13.

(ii) State the age-group which has the least number of students.

Solution:

The frequency distribution table is as below:

Ages	No. of students
0 - 4	0
- 7	85
7 - 10	55
10 - 13	103
13 - 16	57

(i) The number of students in the age group 10 - 13 is 103

(ii) The age group which has the least number of students is 7 - 10

12. Fill in the blanks in the following table:

Class Interval	**Frequency**	**Cumulative Frequency**
25 - 34	**.....**	**15**
35 - 44	**.....**	**28**
45 - 54	**21**	**.....**
55 - 64	**16**	**.....**
65 - 74	**.....**	**73**
75 - 84	**12**	**.....**

Solution:

Class Interval	Frequency	Cumulative Frequency
25 - 34	15	15
35 - 44	13	28
45 - 54	21	49
55 - 64	16	65
65 - 74	8	73
75 - 84	12	85

13. The value of π upto 50 decimal place is
3.14159265358979323846264338327950288419716939937510
(i) Make a frequency distribution table of digits from 0 to 9 after the decimal place.
(ii) Which are the most and least occurring digits?
Solution:

(i) The frequency distribution table of digits from 0 to 9 after the decimal place is as below:

X	0	1	2	3	4	5	6	7	8	9
F	2	5	5	8	4	5	4	4	5	8

Most occurring digits are 3 and 9
Least occurring digits are 0