

RD SHARMA Solutions for Class 9 Maths Chapter 22 - Tabular Representation of Statistical Data

Chapter 22 - Tabular Representation of Statistical Data Exercise 22.26

Question 1

Tally marks are used to find

- (a) class intervals
- (b) range
- (c) frequency
- (d) upper limits

Solution 1

When observations are large, it may not be easy to find the frequencies by simple counting.

So, we make use of tally marks.

Thus, Tally marks are used to find frequency.

Hence, correct option is (c).

Question 2

The difference between the highest and lowest values of the observations is called

- (a) frequency
- (b) mean
- (c) range
- (d) class-intervals

Solution 2

The difference between the highest and lowest value of observations is called 'Range' of observations.

Hence, correct option is (c).

Question 3

The difference between the upper and the lower class limits is called

- (a) mid-points
- (b) class size
- (c) frequency
- (d) mean

Solution 3

The difference between the upper class limit and the lower class limit is called class size.

Hence, correct option is (b).

Question 4

In the class intervals 10 - 20, 20 - 30, 20 is taken in

- (a) the interval 10 - 20
- (b) the interval 20 - 30
- (c) both intervals 10 - 20, 20 - 30
- (d) none of the intervals

Solution 4

Since, 10 - 20, 20 - 30 are Exclusive Class Intervals, the upper limit of a class is not included in the class.

Thus, 20, will be taken in the class 20 - 30.

Hence, correct option is (b).

Question 5

In a frequency distribution, the mid-value of a class is 15 and the class intervals is 4. The lower limit of the class is

- (a) 10
- (b) 12
- (c) 13
- (d) 14

Solution 5

Let the lower limit be x .

Class interval = 4

\Rightarrow Upper limit = $x + 4$

Now, mid-value of a class = $\frac{x + 4 + x}{2} = x + 2 = 15$ (given)

$\Rightarrow x = 13 =$ lower limit

Hence, correct option is (c).

Question 6

The mid-value of a class interval is 42. If the class size is 10, then the upper and lower limits of the class are:

- (a) 47 and 37
- (b) 37 and 47
- (c) 37.5 and 47.5
- (d) 47.5 and 37.5

Solution 6

Let the lower limit of a class = x

Class size = 10

\Rightarrow Upper limit = $x + 10$

Now, mid-value = $\frac{x + 10 + x}{2} = x + 5 = 42$ (given)

$\Rightarrow x = 37 =$ lower limit

$\Rightarrow x + 10 = 47 =$ upper limit

Thus, upper and lower limits are 47, 37.

Hence, correct option is (a).

Chapter 22 - Tabular Representation of Statistical Data Exercise 22.27

Question 7

The number of times a particular item occurs in a given data is called its

- (a) variation
- (b) frequency
- (c) cumulative frequency
- (d) class-size

Solution 7

The number of times a particular item occurs in a given data is called its Frequency.

Hence, correct option is (b).

Question 8

The width of each of nine classes in a frequency distribution is 2.5 and the lower class boundary of the lowest class 10.6. Then the upper class boundary of the highest class is

- (a) 35.6
- (b) 33.1
- (c) 30.6
- (d) 28.1

Solution 8

Number of classes = 9

Lower limit of the lowest class = 10.6

Width of each class = 2.5

So, Upper limit of the lowest class = $10.6 + 2.5 = 13.1$

Now, Upper limit of the lowest class + Width of each class = Upper limit of the next class

Thus, we have

Upper limit of the lowest class + $8 \times$ width of each class = Upper limit of the highest (9th) class

Upper limit of the highest (9th) class = $13.1 + 8 \times 2.5 = 33.1$

Hence, correct option is (b).

Question 9

The following marks were obtained by the students in a test:

81, 72, 90, 90, 86, 85, 92, 70, 71, 83, 89, 95, 85, 79, 62

The range of the marks is

- (a) 9
- (b) 17
- (c) 27
- (d) 33

Solution 9

Range of observations = Highest observation - Lowest observation

$$= 95 - 62$$

$$= 33$$

Hence, correct option is (d).

Question 10

Tally are usually marked in a bunch of

- (a) 3
- (b) 4
- (c) 5
- (d) 6

Solution 10

Tally are usually marked in a bunch of 5: 4 in a vertical line and one is placed diagonally.

Hence, correct option is (c).

Question 11

Let l be the lower class limit of a class-interval in a frequency distribution and m be the mid-point of the class. Then, the upper class limit of the class is

(a) $m + \frac{l+m}{2}$

(b) $l + \frac{m+l}{2}$

(c) $2m - l$

(d) $m - 2l$

Solution 11

Let the class size = S

Lower limit = l

\Rightarrow Upper limit = $l + S$

Now, mid – point = $\frac{l + l + S}{2} = m$ (given)

$\Rightarrow S = 2m - 2l$

Then, Upper limit = $l + S = l + 2m - 2l = 2m - l$

Hence, correct option is (c).

Chapter 22 - Tabular Representation of Statistical Data Exercise Ex. 22.1

Question 1

What do you understand by the word "statistics" in

(i) Singular form

(ii) Plural form

Solution 1

The word statistics is used both in singular and plural sense.

(i) In singular form, it is the science which deals with a collection, presentation, analysis and interpretation of numerical data. This means statistics refers to the subject as a whole.

(ii) In plural form, it refers to a numerical data collected in a systematic manner with a definite purpose, in a specific field of enquiry e.g. the number of people suffering from cancer in different parts of the country.

Question 2

Describe some fundamental characteristics of statistics.

Solution 2

Fundamental characteristics of statistics.

(1) Numerical facts alone constitute statistics. The qualitative characteristics like honesty, poverty, beauty and intelligence which cannot be measured numerically are not statistics.

(2) Statistics are the sum total of all observations. A single observation does not form statistics.

(3) Statistics are collected with a definite purpose. Which means that the statistics collected for one definite purpose, may not suit another situation.

(4) The data collected each time when an experiment is repeated are comparable and the same can be classified into various groups.

Question 3

What are (i) primary data? (ii) secondary data? which of the two – the primary or the secondary data – is more reliable and why?

Solution 3

(i) Primary data:- These are the data collected for the first time by the investigator himself or enumerators working with him. If one is willing to find the height of the students in a particular class, then record of this information made by him would be primary data. This data is thus original in character.

(ii) Secondary data:- Data collected by a person or an organisation for a specific purpose which have already been collected by other people, are known as secondary data. Data collected by a research worker for a particular purpose from a journal or bulletin are secondary data. Thus, data which is available from published records are known as secondary data.

Primary data is highly reliable and relevant. These data give the first hand information because they are original in character. Secondary data should be carefully used, Since they are collected with a purpose different from that of the investigator and may not be fully relevant to the investigation.

Question 4
Why do we group data?

Solution 4
The data obtained in original form are called raw data. Raw data does not give any useful information and is rather confusing to mind. Data is grouped so that it becomes understandable and can be interpreted. We form groups according to various characteristics. After grouping the data, we are in a position to make calculations of certain values which will help us in describing and analysing the data.

Question 5
Explain the meaning of the following terms:

- (i) Variate**
- (ii) Class-interval**
- (iii) Class-size**
- (iv) Class-mark**
- (v) Frequency**
- (vi) Class limits**
- (vii) True class limits.**

Solution 5

(i) **Variate:-** Any character that can vary from one individual to another is called variable or variate.

(ii) **Class-interval:-** Each group into which the raw data is condensed is called a class-interval.

(iii) **Class-size:-** The difference between the true upper limit and true lower limit is called the class-size of that class

(iv) **Class-mark:-** The mid value of a class is called the class-mark.

$$\therefore \text{Class mark} = \frac{\text{Lower limit} + \text{upper limit}}{2}$$

(v) **Frequency:-** The number of observations corresponding to a class is called its frequency.

(vi) **Class limits:-** Each class is bounded by two figures, called the class-limits. The figures on the left side of the classes are called lower limits while figures on the right side are called upper limits.

(vii) **True class limits:-** If the classes are inclusive e.g. 15-19, 20-24, 25-29, 30-34, ---

Then true lower limit of class = Upper limit of class – 0.5

And true upper limit of class = Upper limit of class + 0.5

E.g. true limits of class 15-19 are 14.5 and 19.5

But if classes are exclusive like 10-20, 20-30, 30-40---

Here class limits and true class limits are the same.

Question 6

The ages of ten students of a group are given below. The ages have been recorded in years and months:

8-6, 9-0, 8-4, 9-3, 7-8, 8-11, 8-7, 9-2, 7-10, 8-8

(i) What is the lowest age?

(ii) What is the highest age?

(iii) Determine the range?

Solution 6

The ages of ten students of a group are given below.

8-6, 9-0, 8-4, 9-3, 7-8, 8-11, 8-7, 9-2, 7-10, 8-8

- (i) Lowest age = 7 year, 8 months
- (ii) Highest age = 9 year, 3 months
- (iii) Range = Highest age – Lowest age
= 9 year, 3 months – 7 year, 8 months

= 1 year, 7 months

Question 7

The monthly pocket money of six friends is given below:

Rs 45, Rs 30, Rs 40, Rs 50, Rs 25, Rs 45,

- (i) What is the highest pocket money?
- (ii) What is the lowest pocket money?
- (iii) What is the range?
- (iv) Arrange the amounts of pocket money in ascending order.

Solution 7

The monthly pocket money of six friends is given below:

Rs 45, Rs 30, Rs 40, Rs 50, Rs 25, Rs 45,

- (i) The highest pocket money = Rs 50
- (ii) The lowest pocket money = Rs 25
- (iii) Range = 50 – 25
= Rs 25

- (iv) The amounts of pocket money in ascending order
= Rs 25, Rs 30, Rs 40, Rs 45, Rs 45, Rs 50,

Question 8

Write the class-size in each of the following:

- (i) 0-4, 5-9, 10-14
- (ii) 10-19, 20-29, 30-39
- (iii) 100-120, 120-140, 160-180
- (iv) 0-0.25, 0.25-0.50, 0.50-0.75
- (v) 5-5.01, 5.01-5.02, 5.02-5.03

Solution 8

(i) 0-4, 5-9, 10-14

True class limits are – 0.5-4.5, 4.5-9.5, 9.5-14.5

$$\therefore \text{Class size} = 14.5 - 9.5$$

$$= 5$$

(ii) 10-19, 20-29, 30-39

True class limits are 9.5-19.5, 19.5-29.5, 29.5-39.5

$$\therefore \text{Class size} = 19.5 - 9.5$$

$$= 10$$

(iii) 100-120, 120-140, 160-180

$$\therefore \text{Class size} = 120 - 100$$

$$= 20$$

(iv) 0-0.25, 0.25-0.50, 0.50-0.75

$$\therefore \text{Class size} = 0.25 - 0$$

$$= 0.25$$

(v) 5-5.01, 5.01-5.02, 5.02-5.03

$$\therefore \text{Class size} = 5.01 - 5$$

$$= 0.01$$

Question 9

The final marks in mathematics of 30 students are as follows:

53, 61, 48, 60, 78, 68, 55, 100, 67, 90
75, 88, 77, 37, 84, 58, 60, 48, 62, 56
44, 58, 52, 64, 98, 59, 70, 39, 50, 60

(i) Arrange these marks in the ascending order, 30 to 39 one group, 40 to 49 second group, etc.

Now answer the following:

(ii) What is the highest score?

(iii) What is the lowest score?

(iv) What is the range?

(v) If 40 is the pass mark how many have failed?

(vi) How many have scored 75 or more?

(vii) Which observations between 50 and 60 have not actually appeared?

(viii) How many have scored less than 50?

Solution 9

The final marks in mathematics of 30 students are as follows:

53, 61, 48, 60, 78, 68, 55, 100, 67, 90, 75, 88, 77, 37, 84, 58, 60, 48, 62, 56, 44, 58,
52, 64, 98, 59, 70, 39, 50, 60

(i)

Group	I(30 -39)	II(40 -49)	III(50 -59)	IV(60 -69)	V(70 -79)	VI(80 -89)	VII(90 -99)	VIII(100 -109)
Observations	37, 39	44, 48, 48	50, 52, 53, 55, 56, 58, 58, 59	60, 60, 60, 61, 62, 64, 67, 68	70, 75, 77, 78	84, 88	90, 98	100

(ii) Highest score = 100

(iii) Lowest score = 37

(iv) Range = $100 - 37 = 63$

- (v) If 40 is the pass mark, 2 students have failed.
- (vi) 8 students have scored 75 or more.
- (vii) Observations 51, 54, 57 between 50 and 60 have not actually appeared.
- (viii) 5 students have scored less than 50.

Question 10

The weights of new born babies (in kg) in a hospital on a particular day are as follows:

2.3, 2.2, 2.1, 2.7, 2.6, 3.0, 2.5, 2.9, 2.8, 3.1, 2.5, 2.8, 2.7, 2.9, 2.4

- (i) Rearrange the weights in descending order.
- (ii) Determine the highest weight.
- (iii) Determine the lowest weight.
- (iv) Determine the range.
- (v) How many babies were born on that day?
- (vi) How many babies weigh below 2.5 kg?
- (vii) How many babies weigh more than 2.8 kg?
- (viii) How many babies weigh 2.8 kg?

Solution 10

The weights of new born babies (in kg) are as follows:

2.3, 2.2, 2.1, 2.7, 2.6, 3.0, 2.5, 2.9, 2.8, 3.1, 2.5, 2.8, 2.7, 2.9, 2.4

- (i) The weights in descending order

3.1, 3.0, 2.9, 2.9, 2.8, 2.8, 2.7, 2.7, 2.6, 2.5, 2.5, 2.4, 2.3, 2.2, 2.1

- (ii) The highest weight = 3.1 kg
- (iii) The lowest weight = 2.1 kg
- (iv) Range = $3.1 - 2.1$
= 1.0 kg

- (v) 15 babies were born on that particular day.
- (vi) 4 babies weigh below 2.5 kg.
- (vii) 4 babies weigh more than 2.8 kg.
- (viii) 2 babies weigh 2.8 kg.

Question 11

The number of runs scored by a cricket player in 25 innings are as follows:

26,35,94,48,82,105,53,0,39,42,71,0,64,15,34,67,0,42,124,84,54,48,139,64,47.

- (i) Rearrange these runs in ascending order.
- (ii) Determine the player's highest score.
- (iii) How many times did the player not score a run?
- (iv) How many centuries did he score?
- (v) How many times did he score more than 50 runs?

Solution 11

The numbers of runs scored by a player in 25 innings:

26, 35, 94, 48, 82, 105, 53, 0, 39, 42, 71, 0, 64, 15, 34, 67, 0, 42, 124, 84, 54, 48, 139, 64, 47.

- (i) Runs in ascending order:- 0,0,0,15,26,34,35,39,42,42,47,48,48,53,54,64,64,67,71,82,84,94,105,124,139
- (ii) The highest score = 139
- (iii) The player did not score any run 3 times.
- (iv) He scored 3 centuries.
- (v) He scored more than 50 runs 12 times.

Question 12

**The class size of a distribution is 25 and the first class-interval is 200-224.
There are seven class-intervals.**

- (i) Write the class-intervals.**
- (ii) Write the class-marks of each interval.**

Solution 12

Given:

Class size = 25

First class interval = 200-224.

(i) Seven class intervals are:-

200-224, 225-249, 250-274, 275-299, 300-324, 325-349, 350-374

$$\text{(ii) Class-mark of 200-224} = \frac{200+224}{2} = \frac{424}{2} = 212$$

$$\text{Class-mark of 225-249} = \frac{225+249}{2} = \frac{474}{2} = 237$$

$$\text{Class-mark of 250-274} = \frac{250+274}{2} = \frac{524}{2} = 262$$

$$\text{Class-mark of 275-299} = \frac{275+299}{2} = \frac{574}{2} = 287$$

$$\text{Class-mark of 300-324} = \frac{300+324}{2} = \frac{624}{2} = 312$$

$$\text{Class-mark of 325-349} = \frac{325+349}{2} = \frac{674}{2} = 337$$

$$\text{Class-mark of 350-374} = \frac{350+374}{2} = \frac{724}{2} = 362$$

Question 13

Write the class size and class limits in each of the following

(i) 104, 114, 124, 134, 144, 154, and 164

(ii) 47, 52, 57, 62, 67, 72, 82, 87, 92, 97 and 102

(iii) 12.5, 17.5, 22.5, 27.5, 32.5, 37.5, 42.5, 47.5

Solution 13

(i)

104, 114, 124, 134, 144, 154, and 164

Class size = 114 – 104 = 10

Class mark	Lower class limit	Upper class limit	Class limit
104	$104 - \frac{10}{2} = 99$	$104 + \frac{10}{2} = 109$	99-109
114	$114 - \frac{10}{2} = 109$	$114 + \frac{10}{2} = 119$	109-119
124	$124 - \frac{10}{2} = 119$	$124 + \frac{10}{2} = 129$	119-129
134	$134 - \frac{10}{2} = 129$	$134 + \frac{10}{2} = 139$	129-139
144	$144 - \frac{10}{2} = 139$	$144 + \frac{10}{2} = 149$	139-149
154	$154 - \frac{10}{2} = 149$	$154 + \frac{10}{2} = 159$	149-159
164	$164 - \frac{10}{2} = 159$	$164 + \frac{10}{2} = 169$	159-169

(ii)

47, 52, 57, 62, 67, 72, 77, 82, 87, 92, 97, 102

Class size = $52 - 47 = 5$

Class mark	Lower class limit	Upper class limit	Class limit
47	$47 - \frac{5}{2} = 44.5$	$47 + \frac{5}{2} = 49.5$	44.5 – 49.5
52	$52 - \frac{5}{2} = 49.5$	$52 + \frac{5}{2} = 54.5$	49.5 – 54.5
57	$57 - \frac{5}{2} = 54.5$	$57 + \frac{5}{2} = 59.5$	54.5 – 59.5
62	$62 - \frac{5}{2} = 59.5$	$62 + \frac{5}{2} = 64.5$	59.5 – 64.5
67	$67 - \frac{5}{2} = 64.5$	$67 + \frac{5}{2} = 69.5$	64.5 – 69.5
72	$72 - \frac{5}{2} = 69.5$	$72 + \frac{5}{2} = 74.5$	69.5 – 74.5
77	$77 - \frac{5}{2} = 74.5$	$77 + \frac{5}{2} = 79.5$	74.5 – 79.5
82	$82 - \frac{5}{2} = 79.5$	$82 + \frac{5}{2} = 84.5$	79.5 – 84.5
87	$87 - \frac{5}{2} = 84.5$	$87 + \frac{5}{2} = 89.5$	84.5 – 89.5
92	$92 - \frac{5}{2} = 89.5$	$92 + \frac{5}{2} = 94.5$	89.5 – 94.5
97	$97 - \frac{5}{2} = 94.5$	$97 + \frac{5}{2} = 99.5$	94.5 – 99.5
102	$102 - \frac{5}{2} = 99.5$	$102 + \frac{5}{2} = 104.5$	99.5 – 104.5

(iii)

Class size = $17.5 - 12.5 = 5$

Class mark	Lower class limit	Upper class limit	Class limit
12.5	$12.5 - \frac{5}{2} = 10$	$12.5 + \frac{5}{2} = 15$	10 – 15
17.5	$17.5 - \frac{5}{2} = 15$	$17.5 + \frac{5}{2} = 20$	15 – 20
22.5	$22.5 - \frac{5}{2} = 20$	$22.5 + \frac{5}{2} = 25$	20 – 25
27.5	$27.5 - \frac{5}{2} = 25$	$27.5 + \frac{5}{2} = 30$	25 – 30
32.5	$32.5 - \frac{5}{2} = 30$	$32.5 + \frac{5}{2} = 35$	30 – 35
37.5	$37.5 - \frac{5}{2} = 35$	$37.5 + \frac{5}{2} = 40$	35 – 40
42.5	$42.5 - \frac{5}{2} = 40$	$42.5 + \frac{5}{2} = 45$	40 – 45
47.5	$47.5 - \frac{5}{2} = 45$	$47.5 + \frac{5}{2} = 50$	45 – 50

Question 14

Following data gives the number of children in 40 families:

1, 2, 6, 5, 1, 5, 1, 3, 2, 6, 2, 3, 4, 2, 0, 0, 4, 4, 3, 2, 2, 0, 0, 1, 2, 2, 4, 3,
2, 1, 0, 5, 1, 2, 4, 3, 4, 1, 6, 2, 2.

Represent it in the form of a frequency distribution.

Solution 14

Number of children	Tally marks	Number of families
0		5
1	II	7
2	 II	12
3		5
4	I	6
5		3
6		3

Question 15

The marks scored by 40 students of class IX in mathematics are given below:

81, 55, 68, 79, 85, 43, 29, 68, 54, 73, 47, 35, 72, 64, 95, 44, 50, 77, 64, 35, 79,
52, 45, 54, 70, 83, 62, 64, 72, 92, 84, 76, 63, 43, 54, 38, 73, 68, 52, 54.

Prepare a frequency distribution with class size of 10 marks.

Solution 15

Marks	Tally marks	Frequency
20 - 30	I	1
30 - 40		3
40 - 50		5
50 - 60		8

60 - 70	III	8
70 - 80	III	9
80 - 90	III	4
90 - 100	II	2
		Total = 40

Question 16

The heights (in cm) of 30 students of class IX are given below:

155, 158, 154, 158, 160, 148, 149, 150, 153, 159, 161, 148, 157, 153, 157, 162, 159, 151, 154, 156, 152, 156, 160, 152, 147, 155, 163, 155, 157, 153.

Prepare a frequency distribution table with 160-164 as one of the class intervals.

Solution 16

Heights (in cm)	Tally marks	Frequency
145 - 149	III	4
150 - 154	III	9
155 - 159	III II	12
160 - 164	III	5
		Total = 30

Question 17

The monthly wages of 30 workers in a factory are given below:

830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833, 855, 845, 804, 808, 812, 840, 885, 835, 836, 878, 840, 868, 890, 806, 840, 890.

Represent the data in the form of a frequency distribution with class size 10.

Solution 17

Height	Tally	Frequency
---------------	--------------	------------------

(in cm)	marks	
800 - 810	III	3
810 - 820	II	2
820 - 830	I	1
830 - 840	III III	8
840 - 850	III	5
850 - 860	I	1
860 - 870	III	3
870 - 880	I	1
880 - 890	I	1
890 - 900	III	5
		Total = 30

Question 18

The daily maximum temperatures (in degree celsius) recorded in a certain city during the month of november are as follows:

25.8, 24.5, 25.6, 20.7, 21.8, 20.5, 20.6, 20.9, 22.3, 22.7, 23.1, 22.8, 22.9, 21.7, 21.3, 20.5, 20.9, 23.1, 22.4, 21.5, 22.7, 22.8, 22.0, 23.9, 24.7, 22.8, 23.8, 24.6, 23.9, 21.1.

Represent them as a frequency distribution table with class size 1°c.

Solution 18

Maximum temperature (in degree Celsius)	Tally marks	Frequency
20.0 - 21.0	 I	6
21.0 - 22.0	 	5
22.0 - 23.0	 IIII	9
23.0 - 24.0	 	5
24.0 - 25.0	III	3
25.0 - 26.0	II	2
		Total = 30

Question 19

Construct a frequency table with equal class intervals from the following data on the monthly wages (in rupees) of 28 labourers working in a factory, taking one of the class intervals as 210-230 (230 not included):-

220, 268, 258, 242, 210, 268, 272, 242, 311, 290, 300, 320, 319, 304, 302, 318, 306, 292, 254, 278, 210, 240, 280, 316, 306, 215, 256, 236.

Solution 19

Monthly wages (in rupees)	Tally marks	Frequency
210 - 230	IIII	4
230 - 250	IIII	4
250 - 270	 	5
270 - 290	III	3
290 - 310	 II	7
310 - 330	 	5
		Total = 28

Question 20

The blood groups of 30 student of Class VIII are recoded 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?

Solution 20

Here 9 students have blood groups A, 6 as B, 3 as AB and 12 as O.
So, the table representing the data is as follows:

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

As 12 students have the blood group O and 3 have their blood group as AB. Clearly, the most common blood group among these students is O and the rarest blood group among these students is AB.

Question 21

Three coins were tossed 30 times simultaneously. 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.

Solution 21

By observing the data given above following frequency distribution table can be constructed

Number of heads	Number of times (frequency)
0	6
1	10
2	9
3	5
Total	30

Question 22

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?

Solution 22

(i) Class intervals will be 0 - 5, 5 - 10, 10 -15.....

The grouped frequency distribution table is as follows:

Hours	Number of children
-------	--------------------

0 - 5	10
5 - 10	13
10 - 15	5
15 - 20	2
Total	30

- (ii) The number of children, who watched TV for 15 or more hours a week is 2 (i.e. number of children in class interval 15 - 20).

Question 23

The daily minimum temperatures in degrees celsius recorded in a certain arctic region are as follows:

-12.5, -10.8, -18.6, -8.4, -10.8, -4.2, -4.8, -6.7, -13.2, -11.8, -2.3, 1.2, 2.6, 0, 2.4, 0, 3.2, 2.7, 3.4, 0, -2.4, -2.4, 0, 3.2, 2.7, 3.4, 0, -2.4, -5.8, -8.9, -14.6, -12.3, -11.5, -7.8, -2.9.

Represent them as frequency distribution table taking -19.9 to -15 as the first class interval.

Solution 23

Since first class interval is -19.9 to -15

Frequency distribution with lower limit included and upper limit excluded is:

Temperature	Tally marks	Frequency
-19.9 to -15	II	2
-15 to -10.1	III II	7
-10.1 to -5.2	III	5
-5.2 to -0.3	IIII	4
-0.3 to 4.6	III III III II	17
Total		35

Chapter 22 - Tabular Representation of Statistical Data Exercise Ex. 22.2

Question 1

Define cumulative frequency distribution.

Solution 1

Cumulative frequency distribution:- A table which displays the manner in which cumulative frequencies are distributed over various classes is called a cumulative frequency distribution or cumulative frequency table.

Question 2

Explain the difference between a frequency distribution and a cumulative frequency distribution.

Solution 2

Frequency table or frequency distribution is a method to present raw data in the form from which one can easily understand the information contained in the raw data, where as a table which displays the manner in which cumulative frequencies are distributed over various classes is called a cumulative frequency distribution.

Question 3

The marks scored by 55 students in a test are given below:

Marks:	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No. of students	2	6	13	17	11	4	2

Prepare a cumulative frequency table.

Solution 3

Marks	No. of students	Marks	Cumulative frequency
0-5	2	Less than 5	2
5-10	6	Less than 10	8
10-15	13	Less than 15	21
15-20	17	Less than 20	38
20-25	11	Less than 25	49
25-30	4	Less than 30	53
30-35	2	Less than 35	55
	$N = 55$		

Question 4

Following are the the ages of 360 patients getting medical treatment in a hospital on a day:

Age (in years):	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of Patients:	90	50	60	80	50	30

Construct a cumulative frequency distribution.

Solution 4

Age	No. of	Age	Cumulative
-----	--------	-----	------------

(in years):	patients	(in years)	frequency
10 - 20	90	Less than 20	90
20 - 30	50	Less than 30	140
30 - 40	60	Less than 40	200
40 - 50	80	Less than 50	280
50 - 60	50	Less than 60	330
60 - 70	30	Less than 70	360
	N = 360		

Question 5

The water bills (in rupees) of 32 houses in a certain street for the period 1.1.98 to 31.3.98 are given below:

56, 43, 32, 38, 56, 24, 68, 85, 52, 47, 35, 58, 63, 74, 27, 84, 69, 35, 44, 75, 55, 30, 54, 65, 45, 67, 95, 72, 43, 65, 35, 59.

Tabulate the data and present the data as a cumulative frequency table using 70-79 as one of the class intervals.

Solution 5

The minimum and maximum bills are Rs 24 and Rs 95.

The range is $95 - 24 = 71$

Given class interval is 70 – 79. So, class size is $79 - 70 = 9$

$$\therefore \text{Number of classes} = \frac{\text{Range}}{\text{Class-size}} = \frac{71}{9} = 7.80$$

\Rightarrow Number of classes = 8

The cumulative frequency distribution is as:

Bills (Rs.)	No. of Houses (Frequency)	Cumulative Frequency
16 – 25	1	1
25 – 34	3	4
34 – 43	5	9
43 – 52	4	13
52 – 61	7	20
61 – 70	6	26
70 – 79	3	29
79 – 88	2	31
88 – 97	1	32

Question 6

The number of books in different shelves of a library are as follows:

30, 32, 28, 24, 20, 25, 38, 37, 40, 45, 16, 20
19, 24, 27, 30, 32, 34, 35, 42, 27, 28, 19, 34,
38, 39, 42, 29, 24, 27, 22, 29, 31, 19, 27, 25
28, 23, 24, 32, 34, 18, 27, 25, 37, 31, 24, 23,
43, 32, 28, 31, 24, 23, 26, 36, 32, 29, 28, 21.

Prepare a cumulative frequency distribution table using 45–49 as the last class-interval.

Solution 6

The minimum and maximum numbers of book shelves are 16 and 45.

The range is $45 - 16 = 29$

Given class interval = 45 – 49. SO, class size = $49 - 45 = 4$

$$\therefore \text{Number of classes} = \frac{\text{Range}}{\text{Class - size}} = \frac{29}{4} = 7.25$$

\Rightarrow Number of classes = 8

The cumulative frequency distribution is as:

No. of Books	No. of Shelves (Frequency)	Cumulative Frequency
13 – 17	1	1
17 – 21	6	7
21 – 25	11	18
25 – 29	15	33
29 – 33	12	45
33 – 37	5	50
37 – 41	6	56
41 – 45	3	59
45 – 49	1	60

Question 7

Given below are the cumulative frequencies showing the weights of 685 students of a school. Prepare a frequency distribution table.

Weight (in kg)	No. of students
Below 25	0
Below 30	24
Below 35	78
Below 40	183
Below 45	294
Below 50	408
Below 55	543
Below 60	621
Below 65	674
Below 70	685

Solution 7

Weight (in kg)	No. of students	Class interval	Frequency
Below 30	24	25-30	$24 - 0 = 24$
Below 35	78	30-35	$78 - 24 = 54$
Below 40	183	35-40	$183 - 78 = 105$
Below 45	294	40-45	$294 - 183 = 111$
Below 50	408	45-50	$408 - 294 = 114$
Below 55	543	50-55	$543 - 408 = 135$
Below 60	621	55-60	$621 - 543 = 78$
Below 65	674	60-65	$674 - 621 = 53$
Below 70	685	65-70	$685 - 674 = 11$

Question 8

The following cumulative frequency distribution table shows the daily electricity consumption (in kW) of 40 factories in an industrial state:

Consumption (in KW)	No. of Factories
Below 240	1
Below 270	4
Below 300	8
Below 330	24
Below 360	33
Below 390	38
Below 420	40

(i) Represent this as a frequency distribution table.

(ii) Prepare a cumulative frequency table.

Solution 8

(i)

Consumption (in kW)	No. of Factories	Class interval	Frequency
Below 240	1	0 - 240	1
Below 270	4	240 - 270	4 - 1 = 3
Below 300	8	270 - 300	8 - 4 = 4
Below 330	24	300 -	24 - 8 = 16

		330	
Below 360	33	330 - 360	33 - 24 = 9
Below 390	38	360 - 390	38 - 33 = 5
Below 420	40	390 - 420	40 - 38 = 2

(ii)

Class interval	Frequency	Consumption (in kW)	No. of factories
0 - 240	1	More than 0	40
240 - 270	3	More than 270	40 - 1 = 39
270 - 300	4	More than 270	39 - 3 = 36
300 - 330	16	More than 300	36 - 4 = 32
330 - 360	9	More than 330	32 - 16 = 16
360 - 390	5	More than 360	16 - 9 = 7
390 - 420	2	More than 390	7 - 5 = 2
		More than 420	2 - 2 = 0
	N = 40		

Given below is a cumulative frequency distribution table showing the ages of people living in a locality:

Age in years	No. of persons
Above 108	0
Above 96	1
Above 84	3
Above 72	5
Above 60	20
Above 48	158
Above 36	427
Above 24	809
Above 12	1026
Above 0	1124

Prepare a frequency distribution table.

Solution 9

Age (in years)	No. of persons	Class interval	Frequency
Above 0	1124	0-12	$1124 - 1026 = 98$
Above 12	1026	12-24	$1026 - 809 = 217$
Above 24	809	24-36	$809 - 427 = 382$
Above 36	427	36-48	$427 - 158 = 269$
Above 48	158	48-60	$158 - 20 = 138$
Above 60	20	60-72	$20 - 5 = 15$
Above 72	5	72-84	$5 - 3 = 2$
Above 84	3	84-96	$3 - 1 = 2$
Above 96	1	96-108	$1 - 0 = 1$