RD SHARMA

Solutions

Class 7 Maths

Chapter 23

Ex 23.4

Q1) Find the mode and median of the data: 13, 16, 12, 14, 19, 12, 14, 13, 14

By using the empirical relation also find the mean.

Solution:

Arranging the data in ascending order such that same numbers are put together, we get:

12, 12, 13, 13, 14, 14, 14, 16, 19

Here, n = 9.

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 5th observation = 14.

Here, 14 occurs the maximum number of times, i.e., three times. Therefore, 14 is the mode of the data.

Now,

Mode = 3 Median − 2 Mean

=> 14 = 3 x 14 − 2 Mean

=> 2 Mean = 42 − 14 = 28

=> Mean = 28 ÷ 2 = 14.

Q2) Find the median and mode of the data: 35, 32, 35, 42, 38, 32, 34

Solution:

Arranging the data in ascending order such that same numbers are put together, we get:

32, 32, 34, 35, 35, 38, 42

Here, n = 7

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 4th observation = 35.

Here, 32 and 35, both occur twice. Therefore, 32 and 35 are the two modes.

Q3) Find the mode of the data: 2, 6, 5, 3, 0, 3, 4, 3, 2, 4, 5, 2, 4

Solution:

Arranging the data in ascending order such that same values are put together, we get:

0, 2, 2, 2, 3, 3, 3, 4, 4, 4, 5, 5, 6

Here, 2, 3 and 4 occur three times each. Therefore, 2, 3 and 4 are the three modes.

Q4) The runs scored in a cricket match by 11 players are as follows:

6, 15, 120, 50, 100, 80, 10, 15, 8, 10, 10

Find the mean, mode and median of this data.

Solution:

Arranging the data in ascending order such that same values are put together, we get:

6, 8, 10, 10, 15, 15, 50, 80, 100, 120

Here, n = 11

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 6th observation = 15.

Here, 10 occur three times. Therefore, 10 is the mode of the given data.

Now,

Mode = 3 Median − 2 Mean

=> 10 = 3 x 15 − 2 Mean

=> 2 Mean = 45 − 10 = 35

=> Mean = 35 ÷ 2 = 17.5

Q5) Find the mode of the following data:

12, 14, 16, 12, 14, 14, 16, 14, 10, 14, 18, 14

Solution:

Arranging the data in ascending order such that same values are put together, we get:

10, 12, 12, 14, 14, 14, 14, 14, 14, 16, 18

Here, clearly, 14 occurs the most number of times.

Therefore, 14 is the mode of the given data.

Q6) Heights of 25 children (in cm) in a school are as given below:

168, 165, 163, 160, 163, 161, 162, 164, 163, 162, 164, 163, 160, 163, 163, 164, 163, 160, 165, 163, 162

What is the mode of heights?

Also, find the mean and median.

Solution:

Arranging the data in tabular form, we get:

Height of Children (cm)	Tally Bars	Frequency
160	lll	3
161	l	1
162	llll	4
163	llll llll	10
164	lll	3
165	lll	3
168	l	1
Total		25

Here, n = 25

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 13th observation = 163 cm.

Here, clearly, 163 cm occurs the most number of times. Therefore, the mode of the given data is 163 cm.

Mode = 3 Median − 2 Mean

=> 163 = 3 x 163 − 2 Mean

=> 2 Mean = 326

=> Mean = 163 cm.

Q7) The scores in mathematics test (out of 25) of 15 students are as follows:

19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20

Find the mode and median of this data. Are they same?

Solution:

Arranging the data in ascending order such that same values are put together, we get:

5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25, 25

Here, n = 15

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 8th observation = 20.

Here, clearly, 20 occurs most number of times, i.e., 4 times. Therefore, the mode of the given data is 20.

Yes, the median and mode of the given data are the same.

Q8) Calculate the mean and median for the following data:

Marks: 10   11   12   13   14   16   19   20

Number of students: 3   5   4   5   2   3   2   1

Using empirical formula, find its mode.

Solution:

Calculation of Mean

Marks (x_i)	10	11	12	13	14	16	19	20	Total
Number of Students (f_i)	3	5	4	5	2	3	2	1	$\sum f_i = 25$
$f_i x_i$	30	55	48	65	28	48	38	20	$\sum f_i x_i = 332$

Mean $= \frac{\sum f_i x_i}{\sum f_i} = \frac{332}{25} = 13.28$

Here, n = 25, which is an odd number. Therefore,

Median = Value of $\frac{n+1}{2}$ th observation = Value of the 13th observation = 13.

Now,

Mode = 3Median − 2 Mean

=> Mode = 3 (13) − 2 (13.28)

=> Mode = 39 − 26.56

=> Mode = 12.44.

Q9) The following table shows the weights of 12 persons.

Weight (in kg):   48   50   52   54   58

Number of persons: 4   3   2   2   1

Find the median and mean weights. Using empirical relation, calculate its mode.

Solution:

Weight (x_i)	48	50	52	54	58	Total
Number of Persons (f_i)	4	3	2	2	1	$\sum f_i = 12$
$f_i x_i$	192	150	104	108	58	$\sum f_i x_i = 612$

Mean $= \frac{\sum f_i x_i}{\sum f_i} = \frac{612}{12} = 51$ kg.

Here, n = 12

Median $= \frac{n}{2}$ th observation $+ \frac{n}{2} + 1^{th}$ observation

=> Median $= \frac{\text{Value of } 6^{th} \text{ observation} + \text{Value of } 7^{th} \text{ observation}}{2}$

=> Median $= \frac{50+50}{2} = 50$ kg.

Now,

Mode = 3 Median − 2 Mean

=> Mode = 3 x 50 − 2 x 51

=> Mode = 150 – 102

=> Mode = 48 kg.

Thus, Mean = 51 kg, Median = 50 kg and Mode = 48 kg.