Statistics: Exercise 14.4

Q.1 The following number of goals were scored by a team in a series of 10 matches:
2, 3, 4, 5, 0, 1, 3, 3, 4, 3.
Find the mean median and mode of these scores.

Sol. Since, mean $\bar{x} = \frac{x_1 + x_2 + \ldots + x_{10}}{10}$,

Thus mean, $\bar{x} = \frac{2+3+4+5+0+1+3+3+4+3}{10} = \frac{28}{10} = 2.8$

Now, for median, arrange the given data in ascending order:
0, 1, 2, 3, 3, 3, 3, 4, 4, 5.

Since, there are 10 terms. So, two middle terms = $(\frac{10}{2})^{th}$ and $(\frac{10}{2}+1)^{th}$
= 5^{th} and 6^{th} terms

So, the median will be the mean of the values of the 5th and 6th terms = $\frac{3+3}{2} = 3$

For mode, in the given data 3 occurs most frequently 4 times.
Therefore, mode = 3

Q.2 In a Mathematics test given to 15 students, the following marks (out of 100) are recorded:
41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52, 60
Find the mean, median and mode of this data.

Sol. Since, mean $\bar{x} = \frac{x_1 + x_2 + \ldots + x_{15}}{10}$,

Thus mean, $\bar{x} = \frac{41+39+48+52+46+62+54+40+96+52+98+40+42+52+60}{15}$

$= \frac{822}{15}$
$= 54.8$

Now, for median, arrange the given data in ascending order:
39, 40, 40, 41, 42, 46, 48, 52, 52, 52, 54, 60, 62, 96, 98.

Since, the number of terms is an odd number i.e. 15. So, middle term is obtained by $(\frac{15+1}{2})$ the student,

which is 8th student.
So, the median marks = 52.
Now for mode, the data 52 occurs most frequently 3 times.
Thus, mode = 52

Q.3 The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x.
29, 32, 48, 50, x, x + 2, 72, 78, 84, 95.
Sol. The given data arranged in ascending order as

29, 32, 48, 50, x, x + 2, 72, 78, 84, 95

Since, there are 10 terms. So, there are two middle terms = $(\frac{10}{2})^{th}$ and $(\frac{10}{2}+1)^{th}$

= 5^{th} and 6^{th} terms.

Therefore, the median will be mean of the values of the 5^{th} and 6^{th} terms.

Median = $\frac{x+(x+2)}{2}$ = x+1

Since, given median = 63

So, x + 1 = 63

⇒ x = 63 – 1

⇒ x = 62

Thus value of x is 62.

Q.4 Find the mode :

14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18

Sol. Firstly, arranging the data in ascending order:

14, 14, 14, 14, 17 18, 18, 18, 22, 23, 25, 28.

So, from the data, 14 occurs most frequently 4 times.

So, mode = 14.

Q.5 Find the mean salary of 60 workers of a factory from the following table:

Salary (in ₹)	Number of workers
3000	16
4000	12
5000	10
6000	8
7000	6
8000	4
9000	3
10000	1
Total	60

Sol. For, calculation of Mean, we need to find $\sum f_i x_i$ and $\sum f_i$.

Salary (in Rs) x_i	No. of Workers (f_i)	($f_i x_i$)
3000	16	48000
4000	12	48000
5000	10	50000
6000	8	48000
7000	6	42000
8000	4	32000
9000	3	27000
10000	1	10000
	$\sum f_i = 60$	$\sum f_i x_i = 305000$

Since, Mean $\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = \frac{30500}{60} = 5083.33$

Therefore, mean salary of 60 workers = Rs. 5083.33

Q.6 Give one example of a situation in which
(i) The mean is an appropriate measure of central tendency.
(ii) The mean is not an appropriate measure of central tendency but the median is an appropriate measure of central tendency.

Sol.

(i) The mean is an appropriate measure because it is a unique value which can be used to compare different groups of data. Example: Mean marks scored by students in examination.

(ii) For the Measurement of qualitative characteristics such as beauty, honesty, intelligence etc., mean cannot be used. Therefore mean is not an appropriate measure of central tendency but the median is an appropriate measure of central tendency.