CHAPTER THREE

STATISTICS

In its simplest meaning, statistics can be said to be the branch of mathematics, in which data or information is collected, carefully studied and getting useful conclusions from it.

Frequency:

The frequency of a number is the number of times that it occurs. Example: Consider the following numbers 2, 5, 2, 3, 2, 7, 5:

2 has a frequency of 3

5 has a frequency of2

7 has a frequency of 1.

The range: The range of a group of numbers is the difference between the highest and the lowest number.

Q1. Find the range of the following group of numbers: 2, 10, 7, 5, 17 and 11.

Soln.

The highest number = 17

The lowest number = 2

Range = 17 – 2 = 15

The mode: The mode of a group of numbers is the one, with the highest occurrence or the one with the highest frequency. For example consider the following numbers: 2, 7, 3, 2, 10, 7, 7, 7, 9, 7, 11. The mode = 7

Q2. Find the mode of 10, 10, 11, 15, 10, 8, 20

Soln.

The mode = 10

N/B: - It is possible for a data to have two or three modes. A data with two modes is said to be bimodal, and the one with three modes is said to be trimodal.

Q3. Find the mode of the following numbers: 10, 12, 10, 19, 12, 8, 7, 11.

Soln.

The mode is 10 and 12, since each occurs twice which is the highest occurrence.

Q4. Find the mode of these numbers: 10, 10, 20, 10, 30, 40, 20, 20

Soln.

The mode is 10 and 20.

N/B: It is possible to get a data with no mode.

Q5. Determine the mode of the following numbers: 10, 11, 12, 13, 15

Soln.

There is no mode, since no number has the highest frequency.

Q6. Find the mode of 5, 6, 5, 7, 6, 7, 10, 10.

Soln.

There is no mode.

Q7.

Number	Frequency
2	4
3	8
4	2
5	1

Find the mode of the given table.

Soln.

The number with the highest frequency is 3.$=>$ $The\ mode = 3$.

Q8. Find the mode of this given table:

Number	1	2	3	4	5
No. of occurrence	10	20	18	50	2

The mode = 4.

Q9. Find the mode of the given data:

Mass/g	2	3	4	5	6
No. of occurrence	10	7	5	10	1

The mode is 2 and 5.

N/B: The number of occurrence is the same as the frequency.

Q10. Find the mode of this data:

Age/yrs	Frequency
2	7
3	10
4	12
5	2
6	12

Soln.

The mode is 4 and 6

The median: The median of a group of numbers is the one, which comes exactly in the middle when the numbers are arranged in order.

Q11. Find the median of these numbers: 5, 2, 3, 7, 1

Soln.

Arranging the numbers in order $=>$1, 2, (3), 5, 7 $=>$ the median = 3.

Q12. Determine the median of 9, 4, 3, 8, 5, 3, 2, 3, 8

Soln.

Arranging the numbers in order $=>$2, 3, 3, (4) 5, 8, 9 $=>$ The median = 4

N/B: it is possible to get two numbers as the median.

Q13. Find the median of 4, 3 5, 1.

Soln.

Arranging the numbers in order $=>$1, (3, 4), 5

The median = 3 and 4 or the median = $\frac{3+4}{2} = \frac{7}{2} = 3\frac{1}{2} = 3.5$

Formula for the median's position:

The position of the median is given by $\frac{N+1}{2}$, where N = the number of items.

Q1. Find the median of 3, 1, 2.

Soln.

Arranging them in order $=>$ 1, 2, 3. N = 3, since there are three numbers. The median's position = $\frac{N+1}{2} = \frac{3+1}{2} = \frac{4}{2} = 2, => \textit{the median is the } 2^{nd}$ number after arranging them in order. $\therefore Median = 2$.

Q2. Find the median of 5, 2, 2, 3, 1, 8, 4.

Soln.

Arranging them in order $=>$1, 2, 2, 3, 4, 5, 8. N = 7

Median's position = $\frac{N+1}{2} = \frac{7+1}{2} = \frac{8}{2} = 4 \Rightarrow 4^{th}$ item is the median $\Rightarrow$ $the\ median = 3.$

N/B: In calculating the median's position, when a fraction is had $\Rightarrow$two numbers constitute the median.

Q3. Find the median of 2, 1, 7, 5.

Soln.

Arranging them in order $\Rightarrow$ 1, 2, 5, 7. $\Rightarrow$N = 4.

Position of median =$\frac{N+1}{2} = \frac{4+1}{2} = \frac{5}{2} = 2\frac{1}{2}$.

Since 2½ lies between 2 and 3, then the median is the 2nd and 3rd items = 2 and 5, or the median = $\frac{2+5}{2} = \frac{7}{2} = 3\frac{1}{2}$.

Q4. Find the median of the following: 5, 10, 6, 3, 7, 2, 1, 1

Soln.

1, 1, 2, 3, 5, 6, 7, 10. N = 8

Position of median = $\frac{N+1}{2} = \frac{8+1}{2} = \frac{9}{2} = 4\frac{1}{2}, \Rightarrow the\ median = the$ 4th and the 5th items , $\Rightarrow$ the median = 3 and 5.

Q5. You are given the next table. Determine the median.

No.	Freq.
1	2
2	1
3	3
5	1

N/B: The above data can really be represented as 1, 1, 2, 3, 3, 3, 5. The total frequency in this case = N $=>$ N=2+1+3+1 = 7.Position of the median = $\frac{N+1}{2} = \frac{7+1}{2} = \frac{8}{2} = 4, => the$ 4th item is the median. The median = 3.