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CORE CONCEPT OF

BUSINESS MATHMATICS & STATISTICS

1. What is the difference between mean and arithmetic mean?
2. Briefly illustrate the median?
3. What do you understand by mode? Please explain.
4. What is central tendency? Point out the measures of central tendency.
5. Define business statistics and point out its concept. What are the main reasons for the increasing importance of business statistics?

Measures of Central Tendency

This Section describes the most commonly used averages, the arithmetic mean, median and mode.

Measure of Central Tendency
For ungrouped data

The **mean** is the most used measure of location, with the median and the mode being used for specific (special case) applications. The arithmetic mean is the name given to the 'simple average' that most people calculate. **Arithmetic mean = Total value of items divided by Total number of items.**

It is easy to understand and a very effective way of communicating an answer. It does not apply to categorical data and its interpretation can be difficult when used with ordinal data, but it is often justified for practical reasons. Mathematically it is very useful for further calculations. All the data is included in its calculation. Its disadvantage is that it is easily affected by very high or very low value and cannot be measured or checked graphically. Further more, it may not correspond to any actual value in the distribution itself.

We usually employ the symbol $\bar{x}$ (pronounced, 'x bar') to represent the mean of a sample. A general formula for the mean of a sample of n items is therefore:

$$\bar{x} = \sum x/n$$

Whereas-

n= Number of data.

$\sum$ x= Total of given data. is simply translated as "add up all the values of x.

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Example 1:

Calculate mean from the following marks in Statistics obtained by 10 students in a monthly test:

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks	20	18	22	2	8	10	15	5	16	4

Solution1:

Roll No.	Marks x
1	20
2	18
3	22
4	2
5	8
6	10
7	15
8	5
9	16
10	4
Total	**120**

$\bar{x} = \sum x/n$
$= 120 / 10$
Mean = 12 Ans.

MEDIAN-

The median is not as widely used as the mean or mode, but has particular applications. For example the use of the IQ scales with the average figure of 100. Also in the real world we must often deal with data, like salary distribution where relatively small numbers of extreme values can distort the arithmetic mean, the median makes it a typical value. It is easily obtained and not affected by high or low values. However, if the number of items is small or the items are not evenly spread, the median loses a lot of its significance.

Example 2:

Calculate the median for the following data:

310, 290, 280, 275, 225, 195, 200, 200, 190, 185, 175. Recall that there are n items of data in our sample. The position of median is therefore the-

(N+1) / 2 from smallest (or largest) when n is odd. Placing out data in increasing order, we have 310, 290, 280, 275, 225, 200, 200, 195, 190, 185, 175.

The position of the median is – (11+1)/2= 6, hence the median is 200

Example 3:

In Example 2, suppose the number 280 is dropped. Find the median of the new data set.

Arranging the data, in increasing order,

We have 175, 185, 190, 200,200, 225, 275, 280, 290, 310

N=10 is an even number. Hence then position = (N+1)/2

(10+1)/2= 11/2= 5.5 is not a whole number and so the median is taken as the average of the two middle values. So the median is the largest item which is the average of the 5th and 6th items

Median is = (200+225)/2= 212.5

MODE-

The **mode** is the number which appears more times than any number in a given set. It is quoted as a typical value of the variable. The mode can be of great assistance in manufacturing and production. **For example-** production of shoes, clothes and cars etc. It is not affected by very low or very high values and it is an actual value of the distribution. However, it is not clearly defined when no two items have the same value, or two or more items have the same highest frequency.

Example 4:

Find out Mode from following data of sizes of shoes sold at shop in one day:

5	9	8	7	10	5	7	6	7	1	6	2	3	4

Solution 4:

Arrange the data:

1	2	3	4	5	5	6	6	7	7	7	8	9	10

It is clear that the value 7 is the most repetitive value (3 times).

So Mode = 7. Ans.

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