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Ans: to the Q: NO: 1

<u>Ans:</u> <u>Difinning Variable :</u> - A Variable is a Quantity that may change within the context of a mathematical Problem or experiment. Typically, we use a single letter to represent a variable. The letters x, y and z are common generic symbols used for Variables. Something for Sometime, we will choose a letter that reminds us of the Quantity it represents), Such as t for time, v for voltage or b for bacteria.

* Discussing the types of Variables: —

The main types of Variable include : Independent, dependent, Qalitative, Quantitative, discrete & Continuous.

⇒ **Independent Variable**: A variable is independent if it may very freely & does not depend upon changes in other variables. It is usually donated by x.

⇒ **A Dependent Variable**: A variable is dependent if it varies according to changes in other variables. It is usually denoted by y.

⇒ **Qualitative variable**: A variable is qualitative if it can not be represented by a number.

⇒ **Quantitative Variable**: A variable is Quantitative if it can be represented by a number.

⇒ **Discrete Variable**: A variable is discrete if it may take Only a countable number of distinct values such as 0, 1, 2, 3, 4 ... . If a variable can take Only a finite number of distinct values then it must be discrete.

⇒ **Continuous Variable**: A variable is continuous if it can take any value within a finite or infinite interval.

Ans to the Q: NO:02

Ans! Statistics is a branch that deals with every aspect of the data. Statistical Knowledge helps to choose the proper method of collecting the data & employ those samples in the correct analysis process in order to effectively produce the results. In short, Statistics is a crucial process which helps to make the decision based on the data. It helps us understand patterns & trends in data sets. It can be used to analyze data draw conclusions & make predictions. Statistics can also help us understand how things change over time. Statistics are important because they help people make informed decisions. Governments, Organizations, & businesses all collect statistics to help them track progress measure performance, analyze problems & prioritize.

That's why we do Study Statistics. Because its very important to us.

Ans: to the Q. NO. 03

Ans: Sample definitions :-

A Sample is a small data set that Represents a larger set of data, Such as a population. Statisticians often use Samples to make is easier to gather & analyze in - formation.

For example :- The entire population, using population Samples is common among statisticians because it makes it easier to gather & andyse information.

The term sample refers to a smaller, manageable version of a larger group. It is a subject containing the characteristics of a larger population. Samples are used in statistical testing when population size are to large to include all possible members or observation. A sample should represent the population as a whole & not reflect any bias toward a specific attribute.

Discuss Different types of Sample:

Probability Sampling methods:

- Simple random Sampling.

- Systematic Sampling.

- Stratified Sampling.

- Cluster Sampling.

- Convenience Sampling.

- Purposive Sampling.

- Snowball Sampling.

- Quota Sampling.

⇒ Probality Sampling methods include Simple & random Sampling, Systematic Sampling, stratified Sampling & cluster Samping. The Sample is Selected based on non-random Criteria, & not every member of the population has a change being included.

Ans! (a) Discuss mean!—

Definition! The mean of a set of numbers in a data set is obtained by adding up all the numbers then dividing by the size of the data set. When people use the word 'avarage' in every days conversation, they are usually referring to the mean.

* worked example: the age of people in the checkout queue at Alti are as follows:—

23, 54, 2, 6, 20, 25, 21, 64, 19, 19, 75, 36

finding the mean — which in this case is 12

$$\frac{23 + 54 + 2 + 6 + 20 + 25 + 21 + 64 + 19 + 19 + 75 + 36}{12}$$

$$= \frac{364}{12} = 30.33333\ldots$$

* Population mean: If (which is unusual) we have information for the entire population, we use the term population mean for as you would expect, the mean, of the entire population:

we represent the population mean by μ. If
we have data from the entire people or population.
we can calculate it in the same way:-

$$\mu = \frac{1}{N} \sum_{i=1}^{N} x_i$$

where N is the population consisting of $x_1, x_2 \ldots, x_N$.

* Sample mean': When we have taken a sample
of n Observation $x_1, x_2, x_3 \ldots, x_n$ from the
underlying population, we use the term Sample mean
of $x_1, x_2 \ldots x_n$. It is represented by

$$\overline{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

where n is the size of the sample & $x_1, x_2 \ldots x_n$
are the n observations obtained. This is exactly
the same as what has been done above. It is just
a more formal way of expressing it.

* Discussing Standard deviation :—

In statistics, Standard deviation is a measure of how spread out data is in relation to its mean, or expected value.

. low standard deviation : Data clustered tightly around the mean.

. High Standard deviation : Data is more spread out.

Standard deviation is calculated as the square root of the variance. You can ~~butch~~ see ~~with~~ this ~~things~~ Sample of Standard deviation (σ).

A standard deviation (σ) is a measure of how dispersed the data is in relation to the mean. Low or small, standard deviation indicates data are clustered tightly around the mean, and high, or large, standard deviation indicates data are more spread out.