

## Frequently Asked Questions

1. Define parameter.

**Answer:**

Parameter is a quantity or statistical measure that, a given population is used as the value of a variable in some general distribution or frequency function to make it descriptive of that population.

Parameter is a function of the population observations and characteristic of the population.

2. List some of the parameters used in the population.

**Answer:**

The parameters that we use in general are population median, population mode, population correlation or the like which describes the characteristic of the population known as parameter(s). Prof. R.A Fisher termed the statistical constants of the population, using Greek letters mean ( $\mu$ ), median (M), the variance ( $\sigma^2$ ), the skewness ( $\beta_1$ ), kurtosis ( $\beta_2$ ), correlation coefficient ( $\zeta$ ) etc.

3. Name the different types of parameters.

**Answer:**

There are two types of parameters enumerative or survey population parameters on one hand and analytical or super population parameters on the other. This concept of parameters as distinct from the earlier frequency concepts is the basis of the modern theory estimations and the consequent notions of likelihood, sufficiency, etc.

There is distinction between two types of parameters. The Analytical parameters are the super population or parent population parameters and the enumerative parameters are survey populations or sample populations parameters.

4. Write a note on the distribution of the sample population and the parameters used.

**Answer:**

When a parent population is in the form of a Normal population, the means of samples drawn from such a population are themselves normally distributed. But when sampling is not from a Normal population the sample size  $n$  plays a critical role. When  $n$  is small the shape of the distribution will depend largely on the shape of the parent population but  $n$  gets large ( $n$  greater than thirty) the shape of the sampling distribution become more and more like a Normal distribution irrespective of the shape of the parent population.

Central limit theorem allows us to make use of Normal distribution for the population in sampling theory in most of the situations. The characteristics of Normal Distribution is revealed by two statistical constants (parameters)  $\mu$  and  $\sigma^2$  where  $\mu$  is the mean and  $\sigma^2$  is the finite variance of the population. Hence when the

sampling is from a Normal population the parameters are mean  $\mu$  and finite variance  $\sigma^2$ .

5. Explain Sample parameters with an example.

**Answer:**

Variables used to describe the precise condition under which each sample (or measurement) were taken. You may have many parameter values applying to a single sample (such as time, drug concentration, etc.).

OR

Suppose our study is concerned with a sample of college students we may have many parameters from the single sample (such as height, weight, age, intelligence, etc.)

6. Briefly explain Experiment parameters with an example.

**Answer:**

Experiment parameters are variables that can incorporate many sample parameter variables. Generally speaking, when the term parameter is used, it means an experimental parameter. As an example, parameters could be:

- Kryptonite Concentration
- Variety of Yeast
- Andromeda Strain Infection
- Test Repeat Number
- Growth rate of students

7. What do you mean by parameter value?

**Answer:**

Parameter value is one of the possible values assigned to a variable. As an example, the parameters-values from the previous list could be:

- Kryptonite Concentration in ppm, zero, ten, twenty, thirty,
- Variety of Yeast, A or B
- Andromeda Strain Infection, Healthy or Infected
- Test Repeat Number, one or two
- Growth rate may be Ten percent, twenty percent, etc.

8. Explain the parameters uses in a population of qualitative characteristics

**Answer:**

When we are sampling from a qualitative population, parameter is a value used to represent a certain quantifiable characteristic of a population. This is like the proportion of units that fall in a particular class or sometimes mean of a population and often these values are unknown, and are estimated using sample data.

The Characteristics may be Religion, Caste, Language, customs, People, Sex (Male/Female), Culture and traditions etc.

For Example, the population mean is a parameter that is often used to indicate the Number of people quantifiable to different Castes in a certain state.

9. Name the five important parameters used in a sample survey

**Answer:**

The total number of units in the population is known as population size which is denoted by N.

Let us consider a population consisting of N units. Let the population units be Y1, Y2, Y3,....., YN

A function of the population observations that is a function of Y1, Y2, Y3,....., YN is called as the parameter.

1. Mean =  $\bar{Y}$  (E.g.: Average number of students per college.
2. Total Y = (Total number of acres of wheat in a region).
3. Variance =  $\sigma^2$  (variance of the heights of students in an institution).
4. Ratio of two totals or means  $R = Y/X = \bar{Y}/\bar{X}$  (E.g.: Ratio of liquid assets to total assets in a group of families.
5. Proportion of units that fall into some defined class (E.g.: Proportion of people with false teeth).

10. List few parameters used in population ecology

**Answer:**

- Population Size (N) units- individuals. Measures the number of individuals in a population.
- Population Birth Rate (B) units- number of births per time. Measures the number of births per time that occur in a population.
- Population Death Rate (D) units- number of deaths per time. Measures the number of deaths per time that occur in a population.
- Population Growth Rate- **Number of individuals per time. Measures the rate of change of the population size.**
- Per Capita Birth Rate **(b) units- births per time per individual. Measures the number of births per time averaged across all members of the population.**
- Per Capita Death Rate **(d) units - deaths per time per individual. Measures the number of deaths per time averaged across all members of the population.**

11. How do you calculate population mean and variance from population?

**Answer:**

Let us consider a population consisting of N units. Let the population units be Y1, Y2, Y3,....., YN

$$\text{Population Mean} : \bar{Y} = \sum_{i=1}^N Y_i / N$$

$$\begin{aligned} \text{Population Variance} : \sigma^2 &= \sum_{i=1}^N (Y_i - \bar{Y})^2 / N \\ &= (\sum Y_i^2 / N) - \bar{Y}^2 \end{aligned}$$

12. Briefly explain the information associated with a parameter.

**Answer:**

Information associated with the parameters is:

- (1) The name of the parameter – Explains the particular characteristic of the population.
- (2) The algebraic symbol used to represent the parameter- Helps us to identify the property of the population.
- (3) The units of measurement for the parameter- Helps us to measure the characteristic of the population.
- (4) How to calculate the parameter - Methods used for the estimation of the parameters.
- (5) How to describe (in words) that is: What a particular value of that parameter means?

13. Identify the population parameters in the following cases

- a) Population based on the per capita income of the people in a particular city,
- b) Population of length of stay in the birth hospital for all infants born in the United States of the families in that city then the population will consist of all the house-hold in that city.

**Answer:**

- a) The average per capita income of the people in that city is the parameter of the population.
- b) The average length of stay in the birth hospital for all infants born in the United States.

14. What do we do when the population parameters are unknown?

**Answer:**

If the parameters are unknown then our prime emphasis must be to estimate the parameters of the population. In clear terms from the sample we attempt to draw inference concerning the universe by estimating the parameters using statistics or estimators.

Sampling theory helps in estimating unknown population parameters from knowledge of statistical measures based on sample studies. The main objective of sampling theory is to obtain estimate of the parameter from statistic.

Since we usually cannot examine the entire population of interest and the parameters are generally unknown. A statistic is a number that is computed from sample data. We often use a statistic to estimate an unknown population parameter.

15. Explain the objectives of sampling theory related to the parameters of any population.

**Answer:**

Three objectives of the sampling theory are:

- a. Statistical estimation: Sampling theory helps in estimating unknown population parameters from a knowledge of statistical measures based on sample studies. The main objective of sampling theory is to obtain estimate of the parameter from statistic.
- b. Statistical Hypothesis: The second objective of sampling theory is to enable us to decide whether to accept or reject hypothesis based on the parameters. The sampling theory helps in determining whether the observed differences between the actual value of the parameters and its estimated values are actually due to the chance or whether they are really significant.
- c. Statistical Inference: Sampling theory helps in making generalization about the population/ universe from the studies based on samples drawn from it. It also helps in determining the accuracy of such generalization. The ultimate

goal of sampling theory is to understand the properties of the population which are explained by the statistical constants "Parameters".