

## Examrace

# Competitive Exams: Statistics

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what do you understand by word statistics. Give out its definitions (minimum by 4 authors) as explained by various distinguished authors.

Statistics is a branch of applied mathematics concerned with the collection and interpretation of data. It is the science and practice of developing human knowledge through the use of empirical data expressed in quantitative form. It is based on statistical theory which is a branch of applied mathematics. Within statistical theory, randomness and uncertainty are modeled by probability theory. Because one aim of statistics is to produce the "best" information from available data, some authors consider statistics a branch of decision theory. Statistics is a set of concepts, rules, and procedures that help us to: Organize numerical information in the form of tables, graphs, and charts; understand statistical techniques underlying decisions that affect our lives and well-being; and make informed decisions. Statistics is closely related to data management. It is the study of the likelihood and probability of events occurring based on known information and inferred by taking a limited number of samples. It is a part of mathematics that deals with collecting, organizing, and analyzing data.

Statistics has been defined by various people to mean the following:

- According to Horace Secrist statistics is an aggregate of facts affected to a market extent by multiplicity of causes, numerically expressed, enumerated or estimated according to reasonable standard of accuracy, collected in a systemic manner for a predetermined purpose and placed in relation to each other.
- According to Croxton And Cowden statistics is the science of collection, organizing, presentation, analysis and interpretation of numerical data.
- According to prof, Ya Lu Chou statistics is a method of decision making in the face of uncertainty on the basis of numerical data and calculated risks.
- According to prof Wallis and Roberts statistics is not a body of substantive knowledge but a body of methods for obtaining knowledge.

## Development of Statistical Theory

Enumerate some important development of statistical theory; also explain merits and limitation of statistics.

Answer: Theory of probability was initially developed by James Bernoulli, Daniel Bernoulli, Laplace and Karl Gauss according to this theory Probability starts with logic. There is a set of  $N$  elements. We can define a sub-set of  $n$  favorable elements, where  $n$  is less than or equal to  $N$ .

Probability is defined as the rapport of the favorable cases over total cases, or calculated as:  $n$ .

$$p = \frac{n}{N}$$

Normal curve discovered by Abraham de moivre (1687 – 1754). The normal distribution (also called the Gaussian distribution or the famous “bell-shaped” curve) is the most important and widely used distribution in statistics. The normal distribution is characterized by two parameters, and, namely, the mean and variance of the population having the normal distribution.

Jacques quetlet (1796 – 1874) discovered the fundamental principle the constancy of great numbers which became the basic of sampling.

Regression developed by sir Francis galton. It evaluates the relationship between one variable (termed the dependent variable) and one or more other variables (termed the independent variables). It is a form of global analysis as it only produces a single equation for the relationship thus not allowing any variation across the study area.

Karl Pearson developed the concept of square goodness of fit test. Sir Ronald fischer (1890 – 1962) made a major contribution in the field of experimental design turning into science. Since 1935 design of experiments has made rapid progress making collection and analysis of statistical prompter and more economical. Design of experiments is the complete sequence of steps taken ahead of time to ensure that the appropriate data will be obtained, which will permit an objective analysis and will lead to valid inferences regarding the stated problem

## Merits of Statstics

- Presenting facts in a definite form
- Simplifying mass of figure-condensation into few significant figures
- Facilitating comparison
- Helping in formulating and testing of hypothesis and developing new theories.
- Helping in predictions.
- Helping in formulation of suitable policies.

## Limitation of Statstics

- Does not deal with individual measurement.
- Deals only with quantities characteristics.
- Result is true only on an average.
- It is only one of the methods of studying a problem.
- Statistics can be measured. It requires skills to use it effectively, otherwise misinterpretation is possible

- It is only a tool or means to an end and not the end itself which has to be intelligently identified using this tool.

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