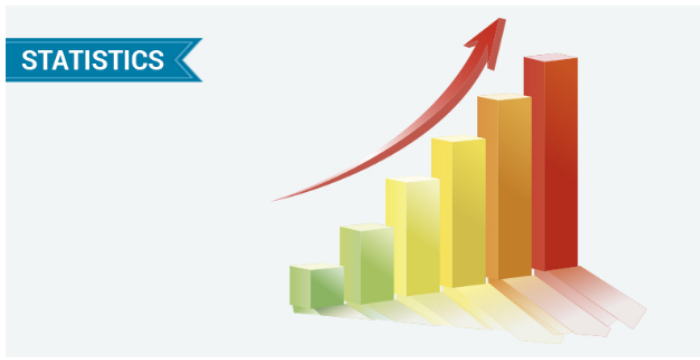


Statistics



Statistics is the study of the collection, analysis, interpretation, presentation, and organization of data. In other words, it is a mathematical discipline to collect, summarize data.

According to **Merriam-Webster dictionary**, statistics is defined as "classified facts representing the conditions of a people in a state – especially the facts that can be stated in numbers or any other tabular or classified arrangement".

According to statistician **Sir Arthur Lyon Bowley**, statistics is defined as "Numerical statements of facts in any department of inquiry placed in relation to each other".

Mathematical Statistics

Mathematical statistics is the application of mathematics to statistics, which was originally conceived as the science of the state – the collection and analysis of facts about a country: its economy, and, military, population, and so forth.

Mathematical techniques used for this include mathematical analysis, linear algebra, stochastic analysis, differential equation and measure-theoretic probability theory.

Scope

Statistics is used in many sectors such as psychology, geology, sociology, weather forecasting, probability and much more. The goal of statistics is to gain understanding from data it focuses on applications and hence, it is distinctively considered as a Mathematical science.

Methods

The methods of collecting, summarizing, analyzing, and interpreting variable numerical data. Here are some of the methods provided below.

- › Data collection
- › Data summarization
- › Statistical analysis

Data

Data is a collection of facts, such as numbers, words, measurements, observations etc.

Types of Data-

1. **Qualitative data-** it is descriptive data.

Example- She can run fast, He is thin.

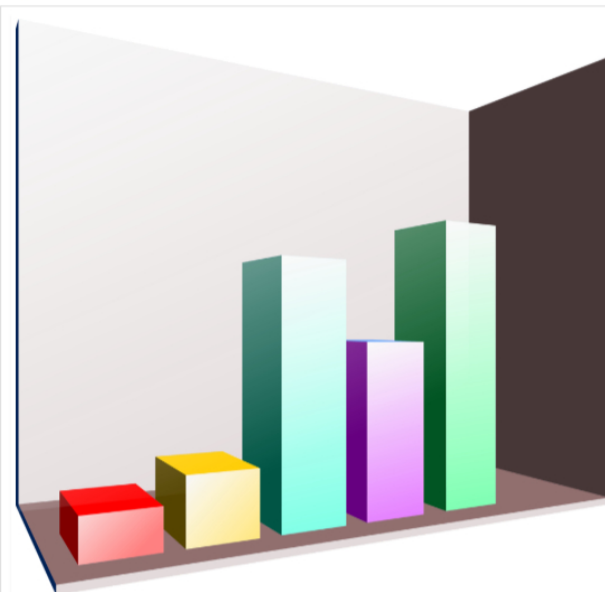
1. **Quantitative data-** it is numerical information.

Example- An Octopus is an Eight legged creature.

Types of quantitative data

- › **Discrete data-** has a particular fixed value. It can be counted
- › **Continuous data-** is not fixed but has a range of data. It can be measured.

Representation of Data-



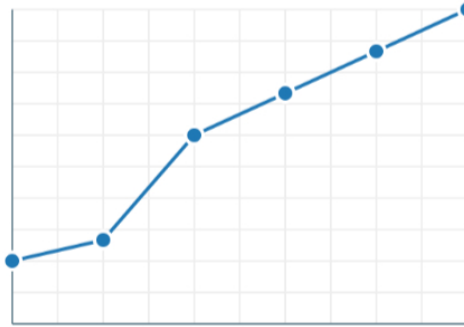
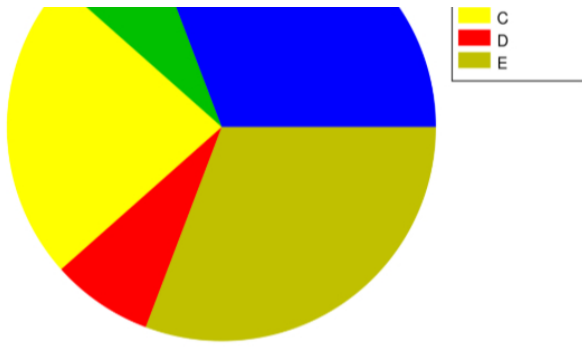
› Bar Graph

A Bar Graph represent grouped data with rectangular bars with lengths proportional to the values that they represent. The bars can be plotted vertically or horizontally.



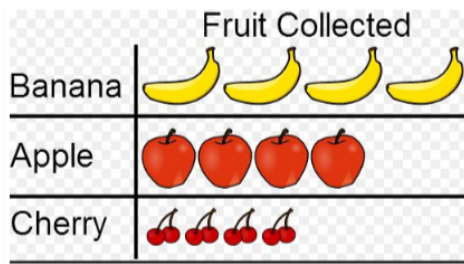
› Pie Chart

A type of graph in which a circle is divided into **Sectors** that each represent a proportion of the whole.



Line graph-

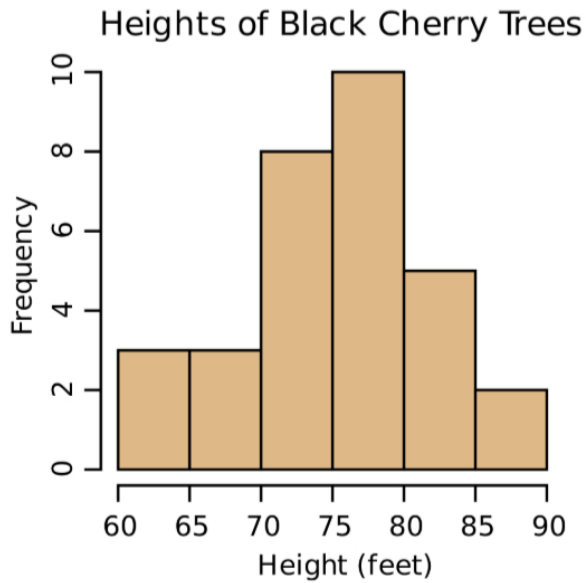
The line chart is represented by a series of data-points connected with a straight line. The series of data points are called 'markers.'



Pictograph-

A pictorial symbol for a word or phrase, i.e. showing data with the help of pictures.

Such as Apple, Banana & Cherry can have different number, it is just a representation of data.



Histogram-

A diagram consisting of rectangles whose area is proportional to the frequency of a variable and whose width is equal to the class interval.

Marks Obtained	Frequency
5	4
6	3
7	6
8	5
9	3
10	1

Frequency Distribution

The frequency of a data value is often represented by "f." A frequency table is constructed by arranging collected data values in ascending order of magnitude with their corresponding frequencies.

Sample Mean (\bar{x})	$\frac{\sum x}{n}$
Population Mean (μ)	$\frac{\sum x}{N}$
Sample Standard Deviation (s)	$\sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$
Population Standard Deviation (σ)	$\sigma = \sqrt{\frac{\sum(x-\mu)^2}{N}}$
Sample Variance (s^2)	$s^2 = \frac{\sum(x-\bar{x})^2}{n-1}$
Population Variance (σ^2)	$\sigma^2 = \frac{\sum(x-\mu)^2}{N}$
Range (R)	Largest data value – smallest data value

Application

- › Some of the application of statistic are given below:
- › Applied statistics, theoretical statistics and mathematical statistics
- › Machine learning and data mining
- › Statistics in society
- › Statistical computing
- › Statistics applied to mathematics or the arts

Hope this detailed discussion and formulas on statistics will help you to solve problems easier and faster. Find the entire solved [NCERT Solutions for Statistics](#) right here.