

## Chapter-15 Frequency Distribution

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### Introduction to Statistics

- A study dealing with the collection, presentation and interpretation and analysis of data is called as statistics.

#### Data

- Facts /figures numerical or otherwise collected for a definite purpose is called as data.
- data collected first-hand data:- Primary
- Secondary data: Data collected from a source that already had data stored

#### Frequency

- The number of times a particular instance occurs is called frequency in statistics.

The word 'statistics' have been derived from Latin word "Status" or the Italian word "Statista", meaning of these words is "Political State"

Originally, statistics was simply the collection of numerical data on some aspects of life of the people useful to the government.

However, with the passage of time, its scope broadened. Today, statistics means collection of facts or information concerning almost every aspect of life of the people with a definite purpose in the form of numerical data, organisation, summarisation and presentation of data by tables and graphs (charts), analysing the data and drawing inferences that is meaningful predictions from the data.

So, a study dealing with the collection, presentation and interpretation and analysis of data is called as "Statistics".

Now students let us discuss some terms related to statistics

1) Data :- Facts / figures numerical or otherwise collected for a definite purpose is called as data.

Primary data :- Data which is collected for the first time by the statistical investigator or with the help of his workers is called primary data.

Secondary data :- These are the data already collected by a person or a society and these may be in published or unpublished form.



2) Variable :- A quantity which can take different values is called a variable. Example :- Height, age and weight of people, income and expenditure of people, number of members in a family, number of workers in a factory, marks obtained by students in a test, the number of runs scored in a cricket match etc.

Variables are of two types:-

(i) Continuous variable → A variable which can take any value between two given values is called a continuous variable.

For example, height, age and weight of people are continuous variables.

(ii) Discontinuous (discrete) variable → A variable which cannot take all possible values between two given values.

For example, the number of members in a family and the number of workers in a factory are discrete variables.

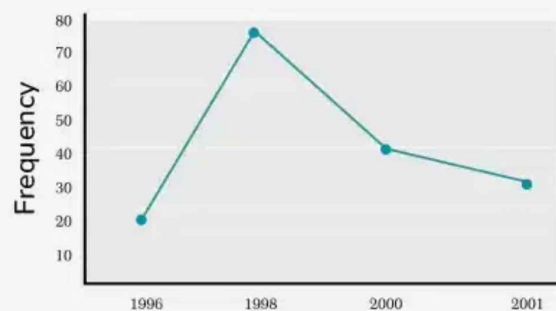
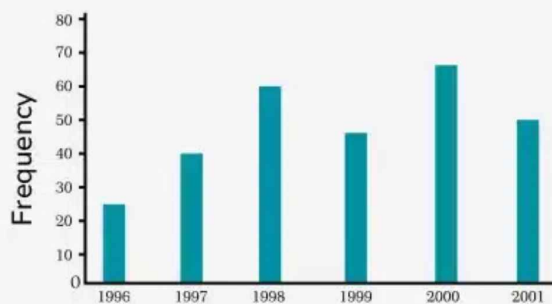
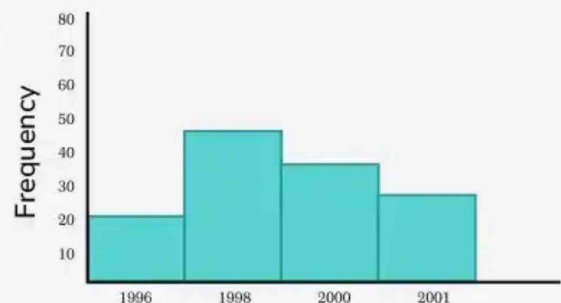
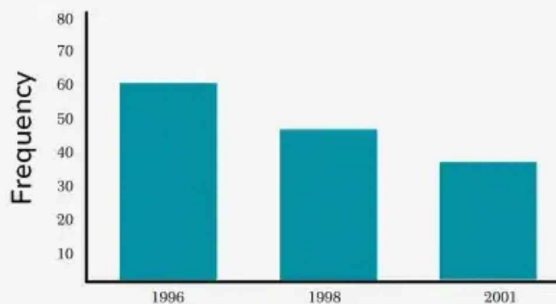
3) Range :- The difference between the maximum and minimum values of a variable is called its range.

4) Variate :- A particular value of a variable is called variate (observation).

- 5) Frequency :- The number of times a variate or observation occurs in a given data is called frequency of that variate.
- 6) Frequency distribution :- A tabular arrangement of given numerical data showing the frequency of different variate is called frequency - distribution, and the table itself is called frequency distribution table.

## FREQUENCY DISTRIBUTION

Frequency Distribution is a tool in statistics that helps us organize the data and also helps us reach meaningful conclusions.





Students, let us now continue further in the topic.

### Raw or Ungrouped Data

The data obtained in original form are called raw data or ungrouped data.

Example:- The marks obtained by 20 students in a class in a certain examination are given below -

25, 8, 48, 45, 16, 45, 40, 29, 30, 11, 35, 33, 24, 16, 20, 14, 16, 40, 25, 29.

This is the raw data.

Arranging the marks of 20 students in ascending order, we get the following array.

8, 11, 14, 16, 16, 16, 20, 24, 25, 25, 29, 29, 30, 33, 35, 40, 40, 45, 45, 48.

What is an array?

It is an arrangement of raw data in ascending order or descending order of magnitude.

### To Prepare A Frequency Distribution Table For Raw Data Using Tally Marks

We take each observation from the data, one at a time, and indicate the frequency that is (the number of times the observation has occurred in the data) by small lines, called tally marks.

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For convenience, we write tally marks in bunches of five, the fifth one crossing the fourth diagonally. In the table so formed, the sum of all the frequencies is equal to the total number of observations in the given data.

Example:-

The sale of shoes of various sizes at a shop on a particular day is given below:-

7 8 5 4 9 8 5 7 6 8 9 6 7 9  
8 7 9 9 6 5 8 9 4 5 5 8 9 6

The above data is clearly raw data.

From this data, we may construct a frequency table, as given

Frequency Table

Size	Tally Marks	Frequency
4	II	2
5	IIII	5
6	IIII	4
7	IIII	4
8	IIII I	6
9	IIII II	7
Total		28

Now, children let us discuss about grouped data and its types.



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### Grouped Data

To put the data in a more condensed form, we make groups of suitable size, and mention the frequency of each group.

Such a table is called a grouped frequency distribution table.

Class-Interval:- Each group into which the raw data is condensed, is called a class-interval. Each class is bounded by two figures, which are called class limits.

Example:- 10-20

Here, 10 is lower limit and 20 is upper limit

### Types of Grouped Frequency Distribution

#### 1) Exclusive Form or Continuous Interval Form

A frequency distribution in which the upper limit of each class is excluded and lower limit is included, is called an exclusive form.

Example:- Suppose the marks obtained by some students in an examination are given. We may consider the classes 0-10, 10-20 etc. In class 0-10, we include 0 and exclude 10. And in class 10-20, we include 10 and exclude 20.

Question:- The daily wages (in rupee) of 28 workers working in a factory are given below:-  
220, 268, 258, 242, 210, 267, 272, 242, 311,  
290, 300, 320, 319, 304, 302, 292, 254, 278,  
318, 306, 210, 240, 280, 316, 306, 215, 256  
and 328.

Form a frequency distribution taking class-interval as 210-230, 230-250 and so on.

So, the frequency are 4, 3, 5, 3, 7 and 6.

Now, let us continue with the topic and discuss about the second type of grouped frequency distribution:-

Inclusive Form or Discontinuous Interval

Form:- A frequency distribution in which each upper limit as well as lower limit is included, is called an inclusive form. Thus, we have classes of the form 0-10, 11-20 etc. In 0-10, both 0 and 10 are included.



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Now, let us discuss important terms related to grouped data :-

1) Class Boundaries or True Upper and True Lower Limits :-

In the exclusive form, the upper and lower limits of a class are respectively known as the true upper limit and true lower limit.

In the inclusive form, the number midway between the upper limit of a class and lower limit of the subsequent class gives the true upper limit of the class and the true lower limit of the subsequent class.

Thus, in the above table of inclusive form, we have :-

true upper limit of class 1-10 is  $\left(\frac{10+11}{2}\right) = 10.5$

2) Class Size :- The difference between the true upper limit and the true lower limit of a class is called its class size.

3) Class Mark of A Class

$$= \frac{\text{True upper limit} + \text{True lower limit}}{2}$$

The difference between any two successive class marks gives the class size.

In 10-20 class interval, class size is  $20-10 = 10$

Class 9, MathsCumulative Frequency of a Class-Interval

The sum of the frequencies of all the previous classes and that particular class, is called the cumulative frequency of the class.

It will be more clear from the following table:-

Class Interval	Frequency	Cumulative Frequency
10-20	90	90
20-30	50	$90 + 50 = 140$
30-40	60	$140 + 60 = 200$
40-50	80	$200 + 80 = 280$

Hope you all have understood the topic