

Chapter 16 : Data

REVISION– DEFINITION, COLLECTION AND ORGANISING DATA:

➤ Definition of data :

The information collected by observation for experiments is called **data**.

Data can be represented graphically by

- i. Pictograph
- ii. Bar graph
- iii. Double bar graph etc.

The data obtained in its original form is called **raw (or ungrouped) data**.

➤ Data collection :

There are 3 different methods of data collection.

- Conducting surveys
E.g. in Singapore a population census is conducted every 10 years.
Find out various characteristics of the population distribution.
- Conducting experiments
E.g. experiments are carried out to find out the average lifespan of a particular brand of energy saving light bulbs ;
- Observations
E.g. scientists often use observations to study behavioral patterns of different species.

➤ Organization of data :

After collecting the data, we arrange the data in systematic tabular form. Arranging the data in systematic tabular form is called **organization of data**.

For e.g.

Fruit	Apples	Peas	Watermelons	Oranges	Banana
Number of students	100	75	80	90	125

MEAN, MEDIAN AND MOOD OF AN UNGROUPED DATA:

The **mean**, **median** and **mode** are measures of central tendency that represent the '**middle**' of set of data.

➤ **Mean:**

The mean is the sum of the observations divided by the number of observations.

- Mean of ungrouped data :

If x_1, x_2, \dots, x_n are the n observations given, then

$$A.M. = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum_{i=1}^n x_i}{n} \text{ or briefly } \frac{\sum x}{n}$$

A.M. is usually denoted by \bar{x} .

Illustration :

Find the mean of the first 10 prime numbers.

Sol: The first 10 prime numbers are **2,3,5,7,11,13,17,19,23,29**

$$\text{Arithmetic mean (A.M.)} = \frac{\text{sum of observations}}{\text{Total number of observations}}$$

$$= \frac{2+3+5+7+11+13+17+19+23+29}{10} = \frac{129}{10} = 12.9$$

- Mean of grouped data :

Let x_1, x_2, \dots, x_n be n observations with respective frequencies f_1, f_2, \dots, f_n .

This can be considered as a special case of raw data where the observations x_1 occurs f_1 times; x_2 occurs f_2 times and so on.

$$\text{The mean of the above data} = \frac{f_1 x_1 + f_2 x_2 + \dots + f_n x_n}{f_1 + f_2 + \dots + f_n}$$

It can also be represented by $\bar{x} = \frac{\sum_{i=1}^n f_i x_i}{\sum_{i=1}^n f_i}$ or briefly $\frac{\sum fx}{\sum f}$

Illustration :

The marks (maximum marks 100) obtained by 20 students in a test are given below.

Marks obtained (x)	Number of students (f)
40	3
55	4
60	2
70	5
75	4
85	1
95	1
	$\Sigma f = 20$

Find the mean marks of 20 students.

Sol: The mean $(\bar{x}) = \frac{\sum fx}{\sum f}$

$$= \frac{(40 \times 3) + (55 \times 4) + (60 \times 2) + (70 \times 5) + (75 \times 4) + (85 \times 1) + (95 \times 1)}{20} = \frac{1290}{20} = 64.5$$

\therefore The mean marks of 20 students = 64.5

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