



Chapter – 14

STATISTICS

Module 2 of 4

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Mean (Average) of Group Data

Mean: The mean \bar{x} of an ungrouped data is obtained by dividing the sum of numbers by the number of data. The mean of 'n' numbers of data $x_1, x_2, x_3, \dots, x_n$ denoted by \bar{x} is defined as

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum_{i=1}^n x_i}{n}$$

The mean of grouped data can be found by three methods:

(i) **Direct Method:** If the variates observations $x_1, x_2, x_3, \dots, x_n$ have frequencies f_1, f_2, \dots, f_n respectively, then the mean is given by

$$\text{Mean } \bar{x} = \frac{f_1 x_1 + f_2 x_2 + \dots + f_n x_n}{f_1 + f_2 + \dots + f_n}$$

$$\bar{x} = \frac{\sum_{i=1}^n f_i x_i}{\sum f_i}$$

(ii) **Assumed Mean Method:** Mean $\bar{x} = A + \frac{\sum f_i d_i}{\sum f_i}$, where A is the assumed mean and $d_i = x_i - A$

In this method, first find the class mark or mid-value of each class, as:

$$x_i = \text{class mark} = \left(\frac{\text{lower limit} + \text{upper limit}}{2} \right)$$

Further, take an approximate mean, called assumed mean. This assumed mean is taken preferably near the middle, say A and the deviation $d_i = x_i - A$ for each variate x_i .

Find the Arithmetic mean of 1,2,3,... n.

Solution. We know that,

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum x_i}{n} = \frac{1+2+3+\dots+n}{n}$$
$$= \frac{1}{n} \left[\frac{n}{2} (2+n-1) \right]$$

[∵ 1+2+3+...+n is an A.P. with first term 1 and last term n. ∴ sum of this A.P. = $\frac{n}{2} (2+n-1)$]

$$= \frac{1}{n} \left[\frac{n(n+1)}{2} \right] = \frac{n+1}{2}$$

If the mean of the following distribution is 6.4, then find the value of p

x	2	4	6	8	10	12
f	3	p	5	3	2	1

Solution.

$$\bar{x} = \frac{\sum f_i x_i}{\sum f}$$

\Rightarrow

$$6.4 = \frac{6 + 4p + 30 + 24 + 20 + 12}{3 + p + 5 + 3 + 2 + 1} =$$

\Rightarrow

$$64 = \frac{(92 + 4p) \times 10}{14 + p} \Rightarrow 920 + 40p$$

Calculate the mean of the following distribution

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	12	18	27	20	17	6

Solution.

Class interval	Frequency	Mid-value (x_i)	$d_i = x_i - A$ ($A = 25$)	$f_i d_i$
0-10	12	5	-20	-240
10-20	18	15	-10	-180
20-30	27	25 = A	0	0
30-40	20	35	10	200
40-50	17	45	20	340
50-60	6	55	30	180
	$\Sigma f_i = 100$			$\Sigma f_i d_i = 300$

Assumed mean be $A = 25$



THANK YOU