ARITHMETIC MEAN

It is simple average of all items in a series. It is the simplest measure of central tendencies.

Formula

$$\bar{X} = X1 + X2 + X3 + \ldots\ldots + Xn \; X / N = \sum X / N$$

Types of arithmetic mean

Arithmetic mean is of two types:

1. Simple arithmetic mean
2. Weighted arithmetic mean

Methods of calculating simple arithmetic mean

We know, there are three types of statistical series:

1. Individual series
2. Discrete series
3. Frequency distribution

Calculation of simple arithmetic mean

In case of individual series, arithmetic mean may be calculated by 2 methods:

1. Direct method
2. Short-cut method

1. Direct method

$$\bar{X} = \sum X / N = \text{Total value of the items / No. of items}$$

Illustration.

Pocket allowance of 10 students is rupees 15,20,30,22,25,18,40,50,55,65. Find out the average pocket allowance.

Solution:

Pocket allowance (Rs) (x)

15

20

30

22

25

18

40

50

55

65

$\sum \boldsymbol{X}$ = **340** X

$\bar{X} = \sum X/N$ = 15+20+30+22+25+18+40+50+55+65/10= 340/10 = 34

Average pocket allowance of the 10 students = Rs 34

2. Short-cut method:

This method is used when the size of item is very large.

d(deviation) = X-A

Formula:-

$\bar{x} = A + \sum d/N$

Calculation of small arithmetic mean in discrete series or frequency array

1. Direct method
2. Short-cut method

3. Step-deviation method

1. Direct method Formula:-

$$\bar{x} = \sum fX / \sum f$$

2. Short-cut method

Short-cut method of estimated mean of the discrete frequency series user the following formula

Formula:-

$$\bar{x} = A + \sum fd / \sum f$$

3. Step-deviation method

(i) Step deviation d' is obtained by dividing the deviation (of the actual value from the assumed average) by the common factor. d' = X-A/C = d/C

Formula:-

$$\bar{x} = A + \sum fd' / \sum f \times C$$

Calculation of simple arithmetic mean in case of frequency distribution

1. Direct method
2. Short-cut method
3. Step-deviation method

1. Direct method

Formula:-

$$\bar{x} = \sum fm / \sum f$$

2. Short-cut method

Formula:-

$$\bar{x} = A + \sum fd / \sum f \times X$$

3. Step-deviation method

(i) Find out deviation of the mid value form some assumed average That is, d=m-A

Formula:-

$$\bar{X} = A + \sum fd' / \sum f \times C$$

Weighted arithmetic mean calculation of weighted mean

Formula:

$$\bar{X}W = \sum WX / \sum W$$

Combined arithmetic mean

Formula:

$$\bar{X}1,2 = \bar{X}1N1 + \bar{X}2N2 / N1 + N2$$

When there are more than 2 parts series, the following formula is used to work out Combined Arithmetic Mean

Formula: $\bar{X}$ 1,2,3……n = $\bar{X}$1N1 + $\bar{X}$2N2 +…+ $\bar{X}$nNn / N1 + N2 +…+N2