

Weighted Arithmetic Mean

We have so far discussed Simple Arithmetic Mean. In simple arithmetic mean, all items of a series are taken as of equal significance.

When different items of a series are weighed according to their relative importance, the average of such series is called Weighted Arithmetic Average. A weighted Arithmetic Average is thus, the mean of weighted items.

Calculation of Weighted Mean.

Calculation of weighted mean involves the following steps:

- (1) Different items are weighed according to their significance. Weights are indicated by 'w'.
- (2) Items (x) are multiplied by their corresponding weights (w) and added up to get $\sum wx$.

③ ΣWX is divided by the sum of total of i.e. ΣW , to get the mean value, that is,

For muler.

$$\bar{X}_w = \frac{\Sigma WX}{\Sigma W}$$

Illustration.

Marks	(x)	81	76	74	58	70	73
Weight	(w)	2	3	6	7	3	7

find weighted mean. —

Solⁿ

Marks x	weight(w)	wx
81	2	162
76	3	228
74	6	444
58	7	406
70	3	210
73	7	511.
	$\Sigma W = 28$	$\Sigma WX = 1961$

Weighted Mean,

$$\bar{X}_w = \frac{\Sigma WX}{\Sigma W} = \frac{1961}{28} = 70.04$$

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Combined Arithmetic Mean

Page No.:

Date:

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When there are 2 part of a series, the following formula is used to work out Combined Arithmetic Mean.

Formula.

$$\bar{X}_{1,2} = \frac{\bar{X}_1 N_1 + \bar{X}_2 N_2}{N_1 + N_2}$$

When there are more than 2 part of a series. the following formula to work out Combined Arithmetic Mean.

formula,

$$\bar{X}_{1,2,3,\dots,n} = \frac{\bar{X}_1 N_1 + \bar{X}_2 N_2 + \dots + \bar{X}_n N_n}{N_1 + N_2 + \dots + N_n}$$

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