WEIGHTED ARITHMETIC MEAN.

We provide equal weightage to every individuals when calculating simple arithmetic mean. But realy there are own diffent importance of every individuals in series.

Weighted arithmetic mean provide their own value and calculate mean.

* Direct method of calculation of weighted Arithmetic mean—

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

Where,

$\bar{X}_w$ = Weighted arithmetic mean.

$\Sigma W.X$ = Sum of weight x individual value.

ΣW = Sum of weight.

* Short cut method—

$$\bar{X}_w = A_w + \frac{\Sigma W.dx}{\Sigma W}$$

Where,

A_w = Assumed weighted mean.

dx = X − Assumed weighted mean.

Ex Computed the weighted arithmetic mean of the index number from the following data -

Group	INDEX No.	Weight
food	125	10
clothing	130	8
fuel and light	140	6
House rent	170	2
miscellaneous	180	4

Solution :

Group	Index No. (x)	Weight (W)	Direct method Wx	INDirect method dx (x - 140)	wdx.
food	125	10	1250	-15	-150
clothing	130	8	1040	-10	-80
fuel and light	140	6	840	0	0
House rent	170	2	340	30	60
Miscellaneous	180	4	720	40	160
		$\Sigma W = 30$	$\Sigma Wx = 4190$		$\Sigma dxw^2 - 10$

* Direct method

$$\therefore \bar{x}_w = \frac{\Sigma Wx}{\Sigma W}$$

$$= \frac{4190}{30}$$

$$= 139.67$$

* weight mean (short cut method)

$$\bar{x}_w = A + \frac{\Sigma dwx}{\Sigma f}$$

$$= 140 + \frac{-101}{30}$$

$$= 140 - 0.33$$

$$= 139.7$$