

Arithmetic Mean.

Calculation of simple Arithmetic Mean in case of Frequency Distribution.

In case of a frequency distribution, items are classified into different class interval like 5-10, 10-15, etc. Each class interval has its frequency.

There are three methods of calculating frequency distribution:

- (1) Direct Method,
- (2) Short-cut Method,
- (3) Step-deviation Method.

(1) Direct Method

(i) The mid-value of the class intervals are calculated. These may be indicated by 'm'. To find the mid-value of class intervals, the lower and upper limits of that class are added and then divided by '2'. Thus, mid-value of the class 10-20 would be determined as.

$$m = \frac{l_1 + l_2}{2} = \frac{10 + 20}{2} = \frac{30}{2} = 15$$

Here m = Mid-Value, l_1 = lower limit
 l_2 = upper limit.

(ii) Mid-value are multiplied by their corresponding frequencies. The multiples ' fm ' are added up to get Σfm .

(iii) Σfm is divided by Σf . The resultant value would be the mean value.

Formula,

$$\bar{X} = \frac{\Sigma fm}{\Sigma f} \text{ or } \frac{\Sigma fm}{N}$$

Illustration

Marks	0-10	10-20	20-30	30-40	40-50
No. of Students	20	24	40	36	20

The above table shows marks in English secured by students of a school in their examination. Calculate mean marks using Direct method and short-cut method.

p.T.O.

Sol ⁿ	Mid value (m)	frequency (f)	$f \times m = fm$
0-10	$\frac{0+10}{2} = 5$	20	100
10-20	$\frac{10+20}{2} = 15$	24	360
20-30	$\frac{20+30}{2} = 25$	40	1000
30-40	$\frac{30+40}{2} = 35$	36	1260
40-50	$\frac{40+50}{2} = 45$	20	900
		$\Sigma f = N$ = 140	$\Sigma fm = 3620$

$$\bar{X} = \frac{\Sigma fm}{N} = \frac{3620}{140} = 25.86$$

Short-cut method

Marks	Mid-value (m)	M-A (d)	fd
0-10	5	$5-25 = -20$	$-20 \times 20 = -400$
10-20	15	$15-25 = -10$	$-10 \times 24 = -240$
20-30	25	$25-25 = 0$	$0 \times 40 = 0$
30-40	35	$35-25 = 10$	$10 \times 36 = 360$
40-50	45	$45-25 = 20$	$20 \times 20 = 400$
			$\Sigma fd = 120$

where $A =$ Assumed Average
 $A = 25$

$$\bar{X} = A + \frac{\sum fd}{N}$$

$$= 25 + \frac{120}{140}$$

$$= 25 + 0.86 = 25.86$$

To be continued
Thank you.