Standard deviation:

Standard deviation (σ) is defined as the square root of the arithmetic mean of the square of the deviation of the values taken from mean. For an individual series

Marks	Frequency (f)	Mid value (x)	X²	fx	$\overline{x} = \frac{\sum fx}{\sum f}$	$\left x-\overline{x}\right $	$\left(x-\overline{x}\right)^2$
0-10	5	5	25	25	27	22	484
10-20	8	15	225	120	27	12	144
20-30	15	25	625	375	27	2	4
30-40	16	35	1225	560	27	8	64
40-50	6	45	2025	270	27	18	324
	$=\sum_{n=1}^{n} f = 50$		$\sum x^2 = 4125$	$\sum fx = 1350$		5	$\sum \left(x - \overline{x}\right)^2 = 1020$

From actual mean:

$$\sigma = \sqrt{\frac{\sum \left(x - \overline{x}\right)^2}{n}}$$

Assumed mean method:

$$\sigma = \sqrt{\frac{\sum d^2}{n} - \left(\frac{\sum d}{n}\right)^2}$$

Where d=x-A (A is assumed mean)

Method based on actual data

$$\sigma = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

Variance:

It is square of the standard deviation Standard deviation = $\sigma^{\rm 2}$

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