

Ungrouped data

$$\text{mean} = \frac{\sum x}{n} @ \frac{\sum fx}{\sum f}$$

$$\text{median} \begin{cases} n \text{ is odd} \Rightarrow x_{\frac{n+1}{2}} \\ n \text{ is even} \Rightarrow \frac{x_{\frac{n}{2}} + x_{\frac{n}{2}+1}}{2} \end{cases}$$

mode: highest frequency @ occur most frequently

$$P_k = \begin{cases} \frac{x_r + x_{r+1}}{2}, & \text{when } r \text{ is an integer} \\ x_{[r]}, & \text{when } r \text{ is non integer} \end{cases}$$

$$Q_1 = P_{25}, Q_2 = P_{50}, Q_3 = P_{75}$$

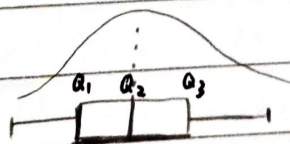
$$\text{Variance, } \sigma^2 = \frac{1}{n-1} \left[\sum x^2 - \frac{(\sum x)^2}{n} \right] @ \frac{1}{n-1} \left[\sum fx^2 - \frac{(\sum fx)^2}{n} \right]$$

Standard deviation, $\sigma = \sqrt{\text{variance}}$

Shape of distribution & skewness

(1) mean, median, mode
(a) mean = median = mode
(symmetrical)

(2) box & whisker plot



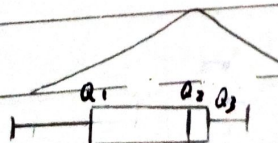
(3) stem & leaf

2	1
3	1 2 3
4	1 2 3 4 5
5	1 2 3
6	1

(4) PEARSON'S COEFFICIENT OF SKEWNESS

$$S_k = 0$$

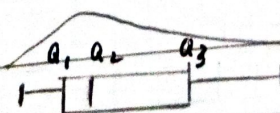
(b) mean < median < mode
(skewed to the left)



2	1
3	1
4	1
5	2 3 4
6	6 7

$$S_k < 0$$

(c) mean > median > mode
(skewed to the right)



2	1 2
3	5 6 7 8
4	2 3
5	1
6	1

$$S_k > 0$$