MEASURES OF DISPERSION OF UNGROUPED DATA

DISPERSION

Dispersion is how wide the data are spread in a data distribution. The stem-and-leaf plots and the dot plots are used to compare and interpret two or more sets of data.

Measures of dispersion

Measures that show the degree of dispersion of the data distribution from the measures of central tendency.

Range

Largest value – Smallest value

Interquartile Range

Third quartile – First quartile

Variance (σ^2)

$$\sigma^2 = \frac{\sum(x - \bar{x})^2}{n}$$

or

$$\sigma^2 = \frac{\sum x^2}{n} - (\bar{x})^2$$

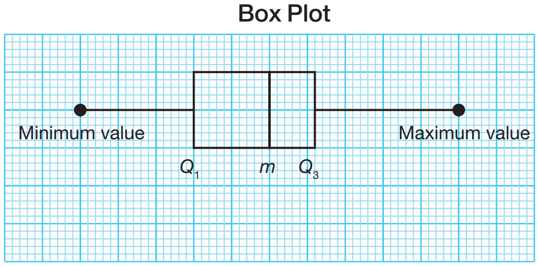
Standard devision (σ)

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

or

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

Box Plot



Advantage

The advantage of using standard deviation as the measure of dispersion is that it can take into consideration each value of data in the set of data.

The Effects of the Changes of Data on the Measures of Dispersion

- Addition / Subtraction of a same value to each value in the set of data does not have any effect on the measures of dispersion.
- Multiplying each value in the set of data by a constant k (integer or fraction) will cause
  (a) the range, interquartile range and standard deviation to be multiplied by k as well,
  (b) the variance to be multiplied by k^2.
- When extreme values exist,
  (a) the range will become larger,
  (b) the interquartile range will not change,
  (c) the variance and standard deviation will become larger.
- When a value which is far from the mean in included, the standard deviation will become larger.
- When a value far from the mean is removed, the standard deviation will become smaller.