

Topic

The Quartile Deviation
Or
Semi-Interquartile deviation

DEFINATION:

The Inter-quartile Range is a measure of dispersion defined by the difference between 3rd and 1st quartiles and half of this range is called semi-inter quartile (S.I.Q.R) or the quartile deviation (Q.D).

FORMULA:

$$Q.D = (Q3 - Q1) / 2$$

Q1 = First Quartile

Q3 = Third Quartile

CO-EFFICIENT OF QUARTILE DEVIATION:

Quartile deviation is an absolute measure of dispersion.

Its relative measure is called Co-efficient of Quartile Deviation.

FORMULA :

Co-efficient of Q.D=

$$\frac{Q_3 - Q_1}{Q_3 + Q_1}$$

It is a pure number used for comparing the variation in two or more sets of data

EXAMPLE

(UNGROUPED DATA)

11, 14, 18, 22, 30, 32, 35

SOLUTION:

$$\begin{aligned} Q1 &= n+1/4 \\ &= 7+1/4 \\ &= 8/4 \\ &= 2 \end{aligned}$$

That is =14

$$\begin{aligned} Q_3 &= 3(n+1)/4 \\ &= 3(7+1)/4 \\ &= 3(8)/4 \\ &= 24/4 \\ &= 6 \end{aligned}$$

That is = 32

$$\begin{aligned} Q.D &= Q_3 - Q_1/2 \\ &= 32 - 14/2 \\ &= 9 \end{aligned}$$

Co-efficient of Q.D =

$$\frac{Q_3 - Q_1}{Q_3 + Q_1}$$

$$=(32-14)/(32+14)$$

$$=18/46$$

$$=0.391$$

EXAMPLE (GROUPED DATA):

CLASS MARKS	f	x	C.B	C.F
10-19	5	14.5	9.5-19.5	5
20-29	25	24.5	19.5-29.5	30
30-39	40	34.5	29.5-39.5	70
40-49	20	44.5	39.5-49.5	90
50-59	10 =100	54.5	49.5-59.5	100

$$Q1 = l + h/f (n/4 - C.F)$$

$$n/4 = 100/4 = 25$$

$$Q1 = 19.5 + 10/25(25 - 5)$$

$$= 19.5 + 200/25$$

$$= 19.5 + 8$$

$$Q1 = 27.5$$

$$Q3 = I + h/f (3n/4 - C.F)$$

$$3n/4 = 3(100)/4 = 75$$

$$Q3 = 39.5 + 10/20(75 - 70)$$

$$= 39.5 + 10/20(5)$$

$$= 39.5 + 2.5$$

$$Q1 = 42$$

$$\begin{aligned} Q.D &= Q_3 - Q_1 / 2 \\ &= 42 - 27.5 / 2 \\ &= 14.5 / 2 \\ &= 7.25 \end{aligned}$$

Co-efficient of Q.D =

$$\frac{Q_3 - Q_1}{Q_3 + Q_1}$$

$$\begin{aligned} &= 42 - 27.5 / 42 + 27.5 \\ &= 14.5 / 69.5 \\ &= 0.20 \end{aligned}$$

ADVANTAGES:

1. It is simple to understand and easy to calculate.
2. Quartile deviation is superior to Range as it is not affected by extremely large or small observations.

DISADVANTAGES:

1. It gives no information about the position of observations laying outside the two quartiles.
2. It is not suited for algebraic expressions.
3. It is greatly affected by sampling variability.

