

* Imp

Statistics and Probability.

Median:

Extensions / properties of median.

* - Quartile = 4 eq parts

- Deciles = 10 eq parts.

* - Percentiles = 100 eq parts

50th percentile is equal to median.

We have to arrange the data for quartile.

Quartiles are used as extensions of median. Quartiles divides dataset into 4 equal parts after arranging the data. The three values Q_1 , Q_2 and Q_3 divides data in four equal parts. Q_1 is lower or first quartile which contains above 75% and below 25% value. Q_3 is upper or last quartile which contains above 25% and below 75% values.

$$Q_1 = \frac{1(n+1)^{th}}{4} \text{ value in the data}$$

$$Q_2 = \frac{2(n+1)^{th}}{4} \text{ value} = \text{median}$$

$$Q_3 = \frac{3(n+1)^{th}}{4} \text{ value in the data.}$$

5, 7, 9, 15, 20, 23, 30, 35, 38, 42, 5

$$\begin{aligned} Q_1 &= \frac{1(10+1)^{th}}{4} = \frac{11}{4} = 2.75^{th} \text{ value} \\ &= 2^{nd} + 0.75(3^{rd} - 2^{nd}) \\ &= 7 + 0.75(9 - 7) \\ &= 8.5 \end{aligned}$$

$$Q_2 = \frac{2(10+1)^{th}}{4} = \frac{11}{2} = (5.5)^{th} = \frac{5^{th} + 6^{th}}{2} = \frac{20 + 23}{2} = \frac{43}{2} = 21.5$$

$$\begin{aligned} Q_3 &= \frac{3(10+1)^{th}}{4} = \frac{3(11)}{4} = 8.25^{th} \\ &= 8^{th} + 0.25(9^{th} - 8^{th}) \\ &= 35 + 0.25(38 - 35) = 37.5 \end{aligned}$$

Measure of Dispersion/Variation.

just like MCT

$$\rightarrow \text{Range} = \text{Max} - \text{Min} \quad \times$$

\rightarrow Variance

\rightarrow Standard Deviation

\rightarrow IQR

(Inter Quartile Range) tells exact location of data

\Rightarrow Variance (S^2)

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

\rightarrow Standard Deviation

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

$\sum x^2$ = pehlay square ko
phir sam kru

$(\sum x)^2$ = pehlay sam ko or
phir whole ko square ko

$$IQR = Q_3 - Q_1$$

(Remove outliers) and work on real data with
outliers

Mean — SD ①

\downarrow
For not having outliers
in datasets.

② Median — IQR

\downarrow
For outliers in data.

agar koi bhi dataset ma
outlier aye chatay wo a sog gyada
hona

Data Presentation.

- Frequency Distribution (Quantitative/Qualitative)
- Graph Presentation
 - \rightarrow Pie chart
 - \rightarrow Bar chart (simple/multiple/component)
 - \rightarrow Histogram

Data Summarization.

\rightarrow Measures of Central Tendency

- Mean — unweighted mean
- Median — Quanti
- Mode — Descile
possible

\rightarrow Measure of Dispersion

- Variance/SD
- IQR
- Coefficient of variation