

* Imp

Statistics and Probability.

Median: properties

Extensions of median.

- Quartiles = 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.

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

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

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

5, 7, 9, 15, 20, 23, 30, 35, 205, 701

$$Q_1 = \frac{1(10+1)}{4}^{\text{th}} = \frac{11}{4} = 2.75^{\text{th}} \text{ value}$$

$$= 2^{\text{nd}} + 0.75(3^{\text{rd}} - 2^{\text{nd}})$$

$$= 7 + 0.75(9 - 7)$$

$$= 8.5$$

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

$$Q_3 = \frac{3(10+1)}{4}^{\text{th}} = \frac{3(11)}{4} = 8.25^{\text{th}}$$

35 + 42.5

$$= 8^{\text{th}} + 0.25(9^{\text{th}} - 8^{\text{th}})$$
$$= 35 + 0.25(205 - 35) = 77.5$$

Measure of Dispersion/Variation.

just like MCI

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

→ Variance

→ Standard Deviation

→ IQR (Inter Quartile Range) tells exact location of data.

⇒ Variance (s^2)

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

$\sum x^2$ = perhlay square ko

→ Standard Deviation

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

$(\sum x)$ = perhlay sum ko or
phir whole ko square ko

$$IQR = Q_3 - Q_1$$

(Remove outliers)

and work on real data with outliers

① Mean — SD

For not having outliers
in datasets.

② Median - IQR

For outliers in data.

agar kisi bhi dataset me
outlier aye chahay wo aayi zyada

Data Presentation.

- Frequency Distribution. (Quantitative / Qualitative)

- Graph Presentation

↳ Pie chart

↳ Bar chart (simple / Multiple / Component)

↳ Histogram

Data Summarization.

↳ Measures of Central Tendency

- Mean — [unweighted mean]

- Median — [Quartile, Decile, Percentile]

- Mode

↳ Measure of Dispersion

- Variance / SD

- IQR

- Coefficient of variation

