# Statistics 101 - Notes

## Measures of Central Tendency

Central tendency measures represent the center or typical value of a dataset. The key measures are:

- \*\*Mean\*\*: The sum of all data points divided by the number of points.  
- \*\*Median\*\*: The middle value when the data is arranged in ascending order.  
- \*\*Mode\*\*: The most frequently occurring value in the dataset.

## Measures of Dispersion

Dispersion measures describe the spread of data points in a dataset. Key measures include:

- \*\*Range\*\*: Difference between the maximum and minimum values.  
- \*\*Variance\*\*: The average of the squared differences from the mean.  
- \*\*Standard Deviation\*\*: The square root of variance, indicating data spread in original units.  
- \*\*Quartiles\*\*: Divide the dataset into four equal parts (Q1, Q2, Q3).  
- \*\*Interquartile Range (IQR)\*\*: Difference between Q3 and Q1, representing the middle 50% of data.

## Example Dataset

Given dataset: [12, 15, 20, 25, 25, 30, 35, 40, 45, 50]

### Mean Calculation

Sum of data points = 297  
Number of data points = 10  
Mean = 297 / 10 = 29.7

### Median Calculation

Arranged dataset: [12, 15, 20, 25, 25, 30, 35, 40, 45, 50]  
Median = (25 + 30) / 2 = 27.5 (Since there are 10 data points)

### Mode Calculation

Mode = 25 (most repeated value)

### Range Calculation

Range = Max - Min = 50 - 12 = 38

## Variance and Standard Deviation

Variance is calculated as the average of squared differences from the mean.

Variance = 1447.28 / 10 = 144.73  
Standard Deviation = √144.73 = 12.03

## Quartiles and IQR

Q1 (25th percentile) = 20  
Q2 (50th percentile, Median) = 27.5  
Q3 (75th percentile) = 40

Interquartile Range (IQR) = Q3 - Q1 = 40 - 20 = 20