

Lecture 8

Excel Statistical Functions

MEDIAN()	VAR()
MODE()	PERCENTILE()
STDEV()	QUARTILE()

STATISTICAL FUNCTIONS IN EXCEL

MEDIAN()

Find the Middle Value



MODE()

Most Frequent Value



STDEV()

Calculate Std. Dev.



VAR()

Calculate Variance



PERCENTILE()

Find Percent Rank



QUARTILE()

Find Quartile Value

1. MEDIAN() – Middle value

Returns the **middle number** when values are sorted.

Syntax:

```
=MEDIAN (range)
```



Median is **not affected by extreme values (outliers)**.

Example:

Sales values:

10, 20, 30, 1000

```
=MEDIAN (A1 : A4)
```

✓ Output → 25

Much better than average when data has outliers.

2. MODE() – Most frequent value

Returns the value that **appears most often**.

Syntax:

```
= MODE . SNGL (range)
```

 Use case:

- Most common order quantity
- Most frequent rating
- Popular product size



Example:

Customer ratings:

4, 5, 5, 3, 5, 4

```
=MODE . SNGL (A1 : A6)
```

Frequencies:

- 5 → **3 times**
- 4 → 2 times
- 3 → 1 time

✓ Output → **5**

2. MODE() – Most frequent value

MODE (Legacy Function)

Returns the **single most frequent value**

Microsoft suggests using **MODE.SNGL** instead.

Customer	Rating
C1	4
C2	5
C3	5
C4	3
C5	5
C6	4
C7	4

OUTPUT
4

MODE.SNGL (Single Mode)

Returns **one most frequent value**.

Returns the smallest value when **there is a tie**.

Customer	Rating
C1	4
C2	5
C3	5
C4	3
C5	5
C6	4
C7	4

OUTPUT
4

MODE.MULT (Multiple Modes)

Returns **all values** that occur most frequently.

Customer	Rating
C1	4
C2	5
C3	5
C4	3
C5	5
C6	4
C7	4

OUTPUT
4
5

2. MODE() – Most frequent value

Comparison Table

Feature	MODE	MODE.SNGL	MODE.MULT
Excel version	Old	Modern	Modern
Returns	One mode	One mode	All modes
Multiple modes	Returns one	Returns first smallest	Returns all
Recommended use	✗ No	✓ Yes	✓ Yes
Output type	Single value	Single value	Array

3. STDEV() – Standard Deviation

How far values are from the **average**.

Syntax:

```
=STDEV.S (range)    // sample data  
=STDEV.P (range)    // population data
```

// sample data

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

// population data

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$$

Example:

Low STDEV → consistent performance

High STDEV → unstable / volatile data

 **Use case:**

- Sales performance analysis
- Quality control
- Financial risk



3. STDEV() – Low vs High STDEV

How far values are from the **average**.

Syntax:

```
=STDEV.S (range)    // sample data
=STDEV.P (range)    // population data
```

Example:

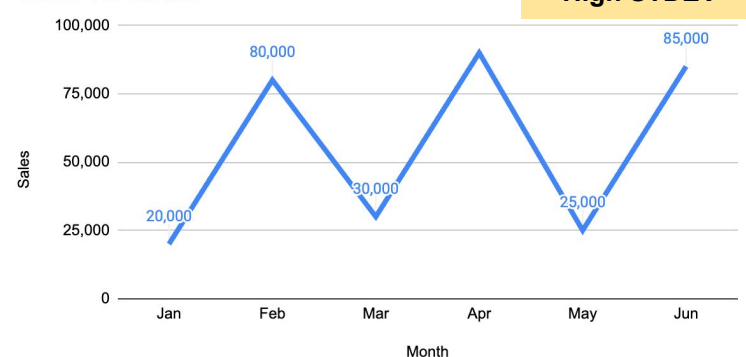
Low STDEV → consistent performance

High STDEV → unstable / volatile data

Sales vs. Month



Sales vs. Month



3. STDEV() – Sample vs Population

How far values are from the **average**.

Syntax:

```
=STDEV.S (range)    // sample data
=STDEV.P (range)    // population data
```

// sample data

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

// population data

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$$

	1	2	3	4	5	6	7	8	9	10	11
Sample Data -	10	9	10	11	9	10	9	11	10	?	?
Population Data -	10	9	10	11	9	10	9	11	10	9	11
	1	2	3	4	5	6	7	8	9	10	11

3. STDEV() – Low vs High STDEV

Low STDEV → consistent performance

High STDEV → unstable / volatile data

Coefficient of Variation (CV)

$$CV = \frac{\text{Standard Deviation}}{\text{Mean i.e. Avg}}$$

👉 Variation is always judged in context.

CV %	Interpretation
< 10%	Very stable
10% – 20%	Acceptable
20% – 30%	High variation
> 30%	Volatile / risky

4. VAR() – Variance

Same as STDEV but **squared** (less intuitive).

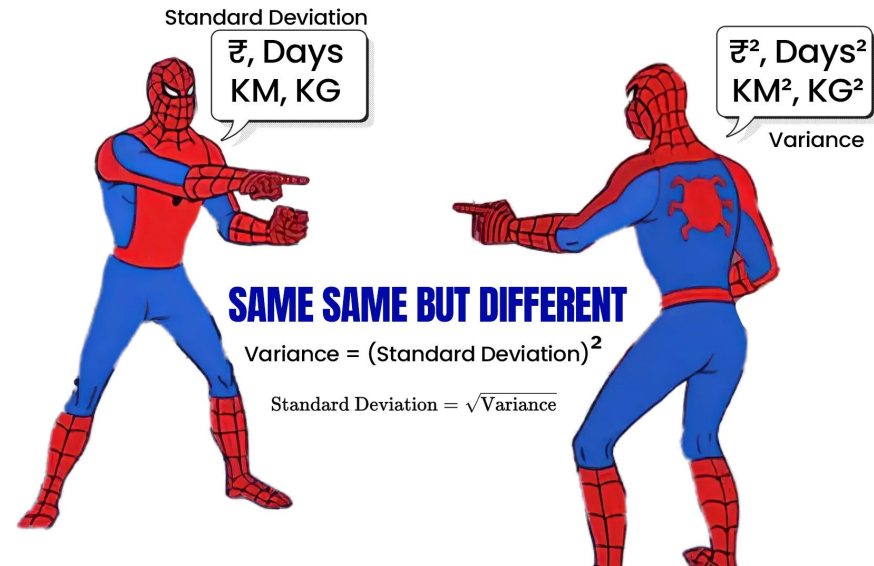
Syntax:

`=VAR.S (range)`

`=VAR.P (range)`

Mostly used in **statistics & analytics**, not day-to-day reporting.

Both **Variance** and **Standard Deviation** measure how spread out data is from the mean.



5. PERCENTILE() – Position-based value

Returns the value **below** which a given % of data falls.

Syntax:

```
=PERCENTILE.INC (range, k)
```



Where **k** = percentile (0 to 1)

Use cases:

- Salary benchmarking
- Top 10% performers
- Exam cutoffs

Example:

Find 90th Percentile Value

```
=PERCENTILE.INC (A1:A100, 0.9)
```

✓ Output → Returns the **90th percentile value**.

6. QUARTILE() – Data split into 4 parts

Divides data into **four equal groups**.

Syntax:

```
= QUARTILE.INC (range, quart)
```



Quart	Meaning
1	Bottom 25%
2	Median
3	Top 25%
4	Max

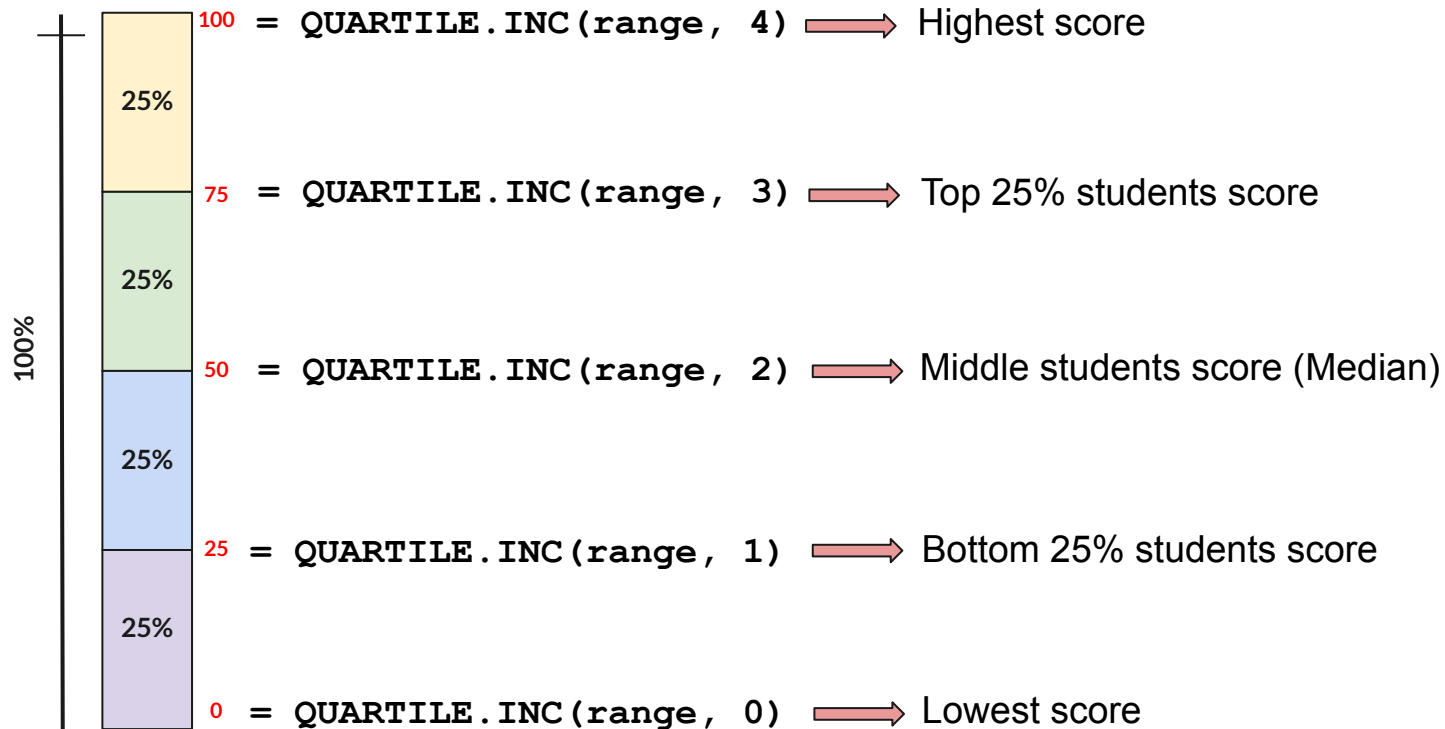
Example:

Find Bottom 25% value

```
=QUARTILE.INC (A1:A50, 1)
```

✓ Output → Returns the **Bottom 25% value**.

6. QUARTILE() – Data split into 4 parts



Excel Statistical Functions Cheat Sheet

Function	Tells You	Formulas
MEDIAN	Middle value	<code>=MEDIAN(range)</code>
MODE	Most common value	<code>= MODE.SNGL(range)</code>
STDEV	Data consistency	<code>=STDEV.S(range)</code> // sample data <code>=STDEV.P(range)</code> // population data
VAR	Spread (squared)	<code>=VAR.S(range)</code> <code>=VAR.P(range)</code>
PERCENTILE	Rank-based cutoff	<code>=PERCENTILE.INC(range, k)</code>
QUARTILE	Data distribution	<code>= QUARTILE.INC(range, quart)</code>