



Macro Programming

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Advanced Data Manipulation Techniques

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Introduction

- Raw data often has skewness, inconsistencies, or scaling issues.
- Advanced techniques make data **comparable, normalized, and analysis-ready**.
- Used in:
 - Data cleaning
 - Preprocessing for dashboards
 - Statistical analysis



Data Transformation

Logarithmic Transformation: =LOG(cell)

- Example: =LOG(B2) → reduces skewness in Sales data.

Power Transformation: =POWER(cell, exponent)

- Example: =POWER(B2,2) → squares the value.

Inverse Transformation: =1/B2

Example: Useful for reciprocal relationships (e.g., speed → time).



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Standardization

Formula: =STANDARDIZE(cell, mean, standard_dev)

Converts data into a standard scale (Z-scores).

Example:

```
=STANDARDIZE(B2,AVERAGE($B$2:$B$10),STDEV($B$2:$B$10))
```

Use case: Compare products with different sales ranges.



Normalization

1. Min-Max Normalization

- Formula: $=(\text{cell} - \text{MIN(range)}) / (\text{MAX(range)} - \text{MIN(range)})$
- Scales values between **0 and 1**.

2. Z-Score Normalization

- Formula: $=(\text{cell} - \text{AVERAGE(range)}) / \text{STDEV(range)}$
- Centers data around mean (0) with unit variance.



Data Type Conversion

- **Text to Number:** `=VALUE(A2)`
- **Number to Text:** `=TEXT(A2, "0.00")`
- **Date Conversion:** `=DATEVALUE("01-Jan-2023")`
- Example: Converting imported text dates into usable Excel date format.



Date to Quarter Conversion

- Formula: =ROUNDUP(MONTH(Date)/3, 0)
- Example:
 - a. Date = 15-Apr-2023 → Output = 2 (Q2)
 - b. Date = 10-Nov-2023 → Output = 4 (Q4)



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Practical Activity

	A	B	C	D
1	Date	Product	Sales	Region
2	01/01/23	A	1000	North
3	02/01/23	B	50000	South
4	03/01/23	C	1200	East
5	04/01/23	D	800	West



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Practical Activity



Apply:

- **Log Transformation** on Sales
- **Min-Max Normalization** across Sales
- **Convert Date → Quarter**



Summary

- **Transformation:** Reduce skewness (LOG, POWER).
- **Standardization & Normalization:** Compare data fairly.
- **Type Conversion:** Ensure correct data formats.
- **Quarter Conversion:** Enable seasonal analysis.



THANK YOU

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