**Day 5: Introduction to DAX (Basic Formulas)**

🧠 What is DAX?

* DAX stands for Data Analysis Expressions.
* It is a formula language used in Power BI, Excel Power Pivot, and SQL Server Analysis Services (SSAS) to define custom calculations and data aggregations.
* DAX is designed to work with relational data models and is optimized for analytical reporting.
* It allows you to create:
  + Calculated Columns: extra columns added to your table.
  + Measures: calculations used in visualizations.
  + Calculated Tables: new tables created using formulas.

📌 Why Use DAX?

* To perform advanced data analytics beyond built-in features.
* To define logic that adapts to filters and slicers in reports.
* To build custom KPIs and performance metrics.

🧮 Basic DAX Functions

1. SUM
   * Adds up values in a numeric column.
   * Syntax: SUM(<column>)
   * Example:  
     Total Sales = SUM(Sales[Amount])
2. COUNT
   * Counts numeric values in a column.
   * Syntax: COUNT(<column>)
   * Example:  
     Order Count = COUNT(Sales[Order ID])
3. COUNTA
   * Counts all non-empty values in a column (numbers, text, etc.).
   * Syntax: COUNTA(<column>)
4. AVERAGE
   * Returns the average of numeric values.
   * Syntax: AVERAGE(<column>)
   * Example:  
     Average Price = AVERAGE(Sales[Price Each])
5. MIN / MAX
   * MIN: Returns the smallest number in a column.
   * MAX: Returns the largest number in a column.
   * Example:  
     Highest Discount = MAX(Sales[Discount])
6. IF
   * Returns values based on logical conditions.
   * Syntax: IF(condition, true\_result, false\_result)
   * Example:  
     Is High Order = IF(Sales[Amount] > 1000, "Yes", "No")
7. DIVIDE
   * Safe division that handles divide-by-zero errors.
   * Syntax: DIVIDE(numerator, denominator, [alternateResult])
   * Example:  
     Profit Ratio = DIVIDE(Sales[Profit], Sales[Revenue], 0)

🛠 Creating Simple Measures

* Measures are calculations evaluated at the time of report viewing, based on context (filters, slicers).
* Measures are dynamic and do not store data in the table.

Example:  
Total Revenue = SUM(Sales[Quantity Ordered] \* Sales[Price Each])

🛠 Creating Calculated Columns

* Calculated columns are static expressions that are added to the data model as new fields.
* They are evaluated during data load or refresh.

Example:  
Final Price = Sales[Price Each] \* (1 - Sales[Discount])