Introduction to DAX

Section 1: Learn

What is DAX?

DAX (**Data Analysis Expressions**) is a formula language used in Power BI, Power Pivot, and SQL Server Analysis Services. It allows users to **create custom calculations** on data models, enhancing data analysis and reporting.

Why Use DAX?

- **Performs Advanced Calculations**: Helps compute totals, averages, and other aggregations.

- **Enhances Data Modeling**: Enables calculated columns and measures.

- **Optimizes Data Processing**: Reduces dependency on external calculations in Excel or SQL.

- **Enables Time Intelligence**: Used for trend analysis, year-to-date (YTD) calculations, and comparisons.

Key Features of DAX

Feature	Description

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Calculated Columns	Create new columns based on existing data.
Measures	Perform calculations dynamically in reports.
Aggregation Functions	SUM, AVERAGE, COUNT, MIN, MAX for numerical calculations.
Logical Functions	IF, SWITCH, AND, OR for decision-making calculations.
Time Intelligence	Functions for comparing data across different time periods.

How Does DAX Work in Power BI?

1. **Import Data** → Load a dataset into Power BI.

2. **Define Measures** → Use DAX to create new calculations.

3. **Apply Filters & Context** → Use row and filter contexts to control calculations.

4. **Visualize Data** → Use DAX measures in Power BI reports.

A Brief History

DAX was introduced by **Microsoft in 2010** as part of **Power Pivot for Excel**. It later became the backbone of Power BI, allowing users to create **custom calculations beyond traditional Excel formulas**.

Section 2: Practice

Basic DAX Syntax

Creating a Measure

```
Total Sales = SUM(Sales[Amount])
```

- This measure **sums up** all values in the "Amount" column.

Using Conditional Logic (IF Statement)

```
Sales Category = IF(Sales[Amount] > 5000, "High", "Low")
```

- This creates a new column categorizing sales as **High** or **Low**.

Calculating Year-to-Date Sales

```
YTD Sales = TOTALYTD(SUM(Sales[Amount]), Sales[Date])
```

- This calculates **Year-to-Date** (YTD) sales.

Example: Calculating Profit Margin

```
Profit Margin = DIVIDE(Sales[Profit], Sales[Revenue])
```

- Uses DIVIDE to avoid division errors.

Section 3: Know More

Frequently Asked Questions

1. What is the difference between a Measure and a Calculated Column?

- **Measure**: A dynamic calculation performed when data is filtered in a report.
- **Calculated Column**: A static calculation stored within the dataset.

2. Can I use DAX without Power BI?

Yes, DAX is also used in **Excel Power Pivot** and **SQL Server Analysis Services**.

3. What are row context and filter context in DAX?

- **Row Context**: Applies calculations **row by row**.

- **Filter Context**: Applies calculations based on **selected filters** in a report.

4. Is DAX similar to Excel formulas?

DAX is **similar but more powerful** than Excel formulas, allowing **better performance and efficiency** in large datasets.

5. How do I debug a DAX formula?

- Use **DAX Studio** to analyze and debug complex DAX queries.
- Break down calculations into **smaller steps**.

6. Can DAX be used for real-time data calculations?

Yes, but DAX calculations depend on **data refresh frequency** in Power BI.

These notes will help you **get started with DAX**, create calculations, and improve Power BI reports. Mastering DAX ensures better **data analysis and insights**!