

Microsoft Learn
Student Ambassadors

Understanding DAX in Power BI


Chinonso Okonkwo
Alpha Microsoft Learn Ambassador



Pre-requisites

- Power BI Desktop installed
- Tabular Editor
- Power BI Knowledge

Today's Agenda

- Intro to DAX
 - Data Modelling
 - Time-intelligence Calculations
 - Row-Level Security
 - Other DAX Calculations
- 
- A decorative graphic at the bottom of the slide consisting of two horizontal lines. The top line is blue and the bottom line is purple. Both lines have small dots of the same color at regular intervals.

Introduction to DAX

What is DAX?

DAX - Data Analysis Expressions

DAX is a language designed to compute business formulas over a Data Model



What is a Data Model?

A data model is a set of tables, linked by relationships. To create a data model, you start by adding data to your model. You can import more than one table, then you need to create a relationship.



Introduction to DAX

DAX is a collection of functions, operators and constants used to calculate and return one or more values.

Functions: SUM(), AVERAGE()

Operators: +, -, *

Introduction to DAX

DAX formulas enable us to perform advanced calculations and queries on data in related tables and columns in tabular data models.

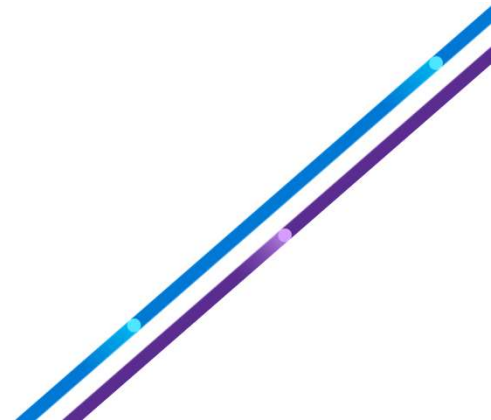


Importance of DAX in Power BI

You can easily create a Power BI Report file (pbix), by importing your data, extracting and showing valuable insights from the data without using DAX at all.

But what if you need to calculate your Year-On-Year Growth and compare it to your target, or you need to analyze growth percentage across product categories.

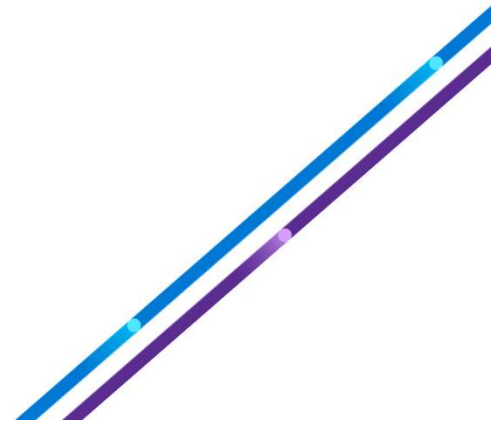
Learning DAX will help you get the most out of your data.



Importance of DAX in Power BI

With DAX, you can;

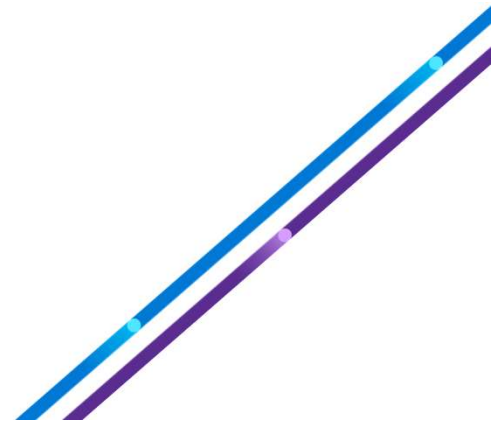
- Create Calculated columns
- Create Calculated Tables
- Create Measures and,
- Apply Row level Security



Understanding DAX

There are three important or fundamental concepts in Dax

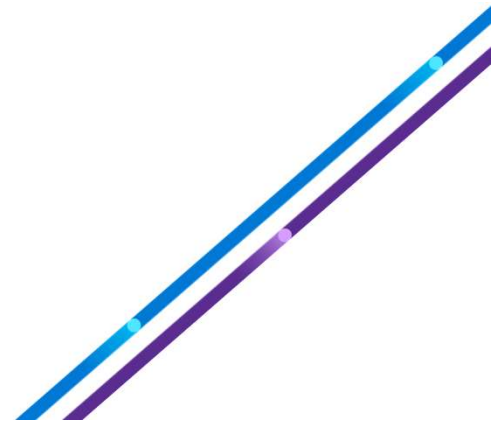
- Syntax
- Functions
- Context



Syntax

Syntax is the various elements that makes up a formula or how you write a formula. It includes;

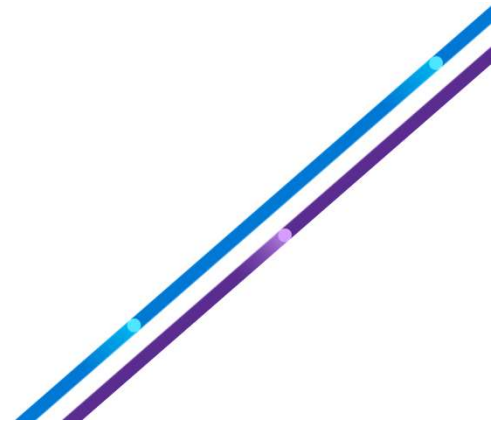
- The Measure name
- The Equals sign
- The DAX function
- The parenthesis
- The referenced table and,
- The referenced column



Syntax

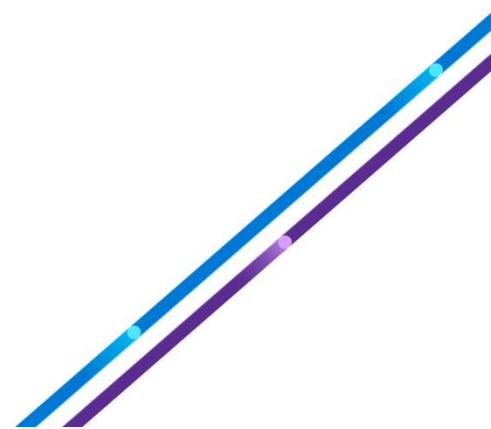
A typical example to explain this

Total Sales = SUM(Sales[Sales Amount])



Syntax

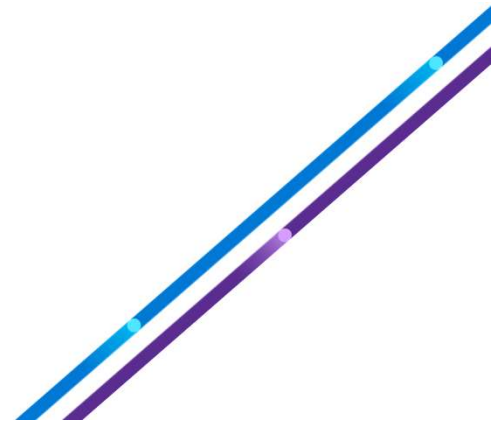
Total Sales = SUM('Sales Details'[Sales Amount])



Task: Create a Measure

Create a measure that answers the following questions

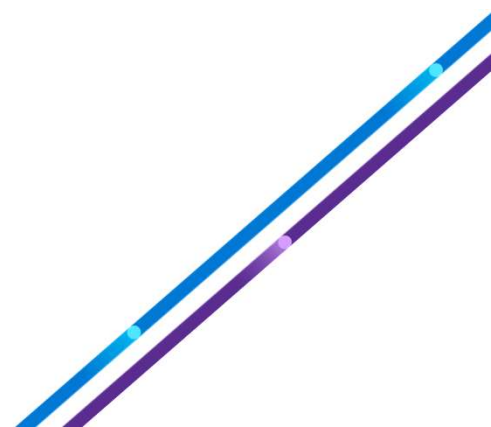
1. Which employee has the highest sales?
2. Which customer has the highest sales?
3. How much has our customer "Save-a-lot Markets" spent?



QUIZ: Create a Measure

What always surrounds a column name in a DAX formula?

- a. Square Bracket
- b. Parenthesis
- c. Quotation mark

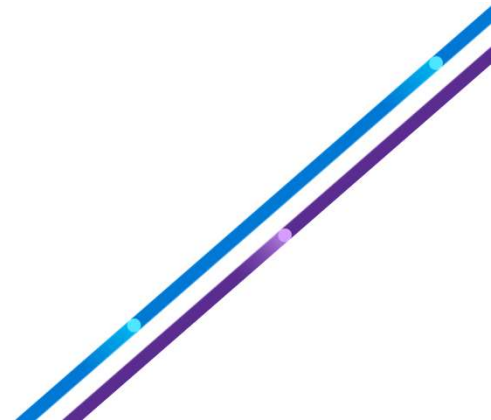


Functions

Functions are predefined formulas that perform calculations by using specific values, called arguments.

DAX functions can be classified based on

- The result (Single value, Table)
- The purpose(Financial, Ranking e.tc)



Functions

MATH & STATS

Common Examples:

- SUM
- AVERAGE
- MAX/MIN
- DIVIDE
- COUNT/COUNTA
- COUNTROWS
- DISTINCTCOUNT

Iterator Functions:

- SUMX
- AVERAGEX
- MAXX/MINX
- RANKX
- COUNTX

TEXT

Common Examples:

- CONCATENATE
- FORMAT
- LEFT/MID/RIGHT
- UPPER/LOWER
- PROPER
- LEN
- SEARCH/FIND
- REPLACE
- TRIM
- UNICHAR

FILTER

Common Examples:

- FILTER
- ALL
- ALLEXCEPT
- DISTINCTCOUNT
- DISTINCT
- VALUES
- ISFILTERED

Iterator Functions:

- SUMX
- AVERAGEX
- MAXX/MINX
- RANKX
- COUNTX

TIME INTELLIGENCE

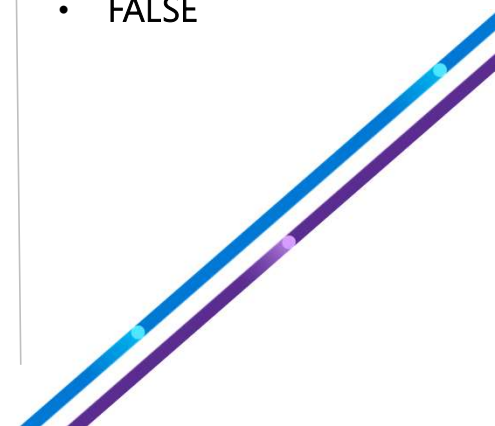
Common Examples:

- DATEDIFF
- YEAR/MONTH/DAY
- WEEKDAY
- DATESYTD
- DATESQTD
- DATEADD

LOGICAL

Common Examples:

- IF
- IFERROR
- AND
- OR
- NOT
- SWITCH
- TRUE
- FALSE

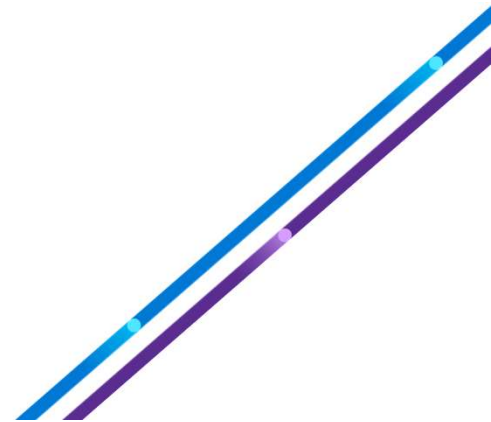


Functions

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DAX functions are unique in the following ways;

- They always reference a complete column or table. If you want to reference values you'll need to add filter

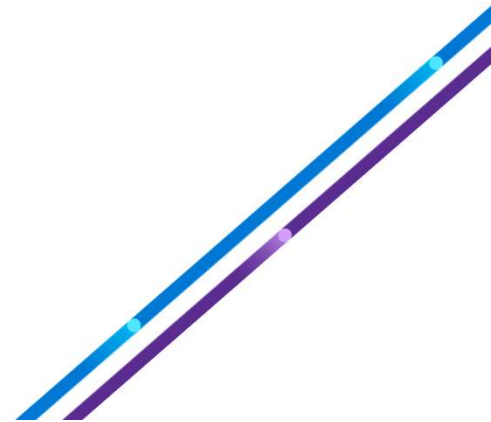


TIME-INTELLIGENCE Functions

Helps in performing time-related calculations

Requirements:

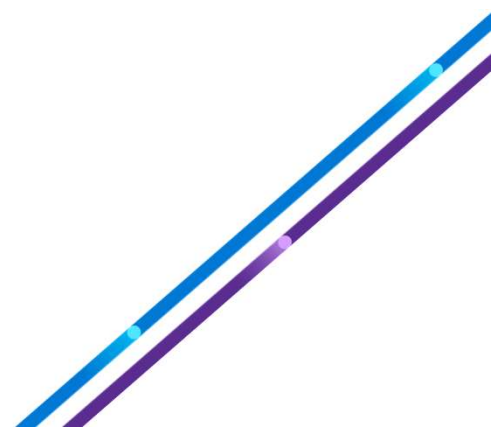
- Requires a marked date-table



Task: Functions

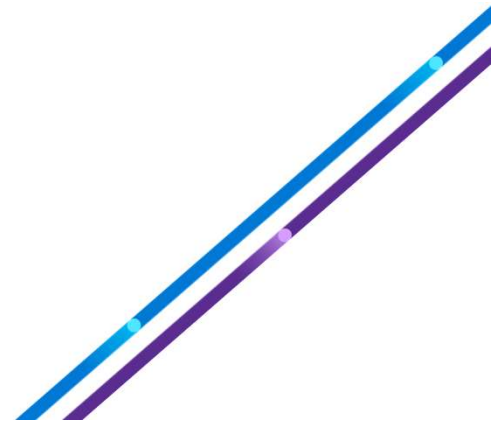
Create a measure that answers the following questions;

1. Calculates the total sales for the previous month/year depending on the filters applied?
2. Calculates the total shipping cost for the previous month/year depending on the filters applied?
3. Calculates the total customers for the previous month/year depending on the filters applied?
4. Calculates the "On-Time Delivery Rate"



QUIZ: Functions

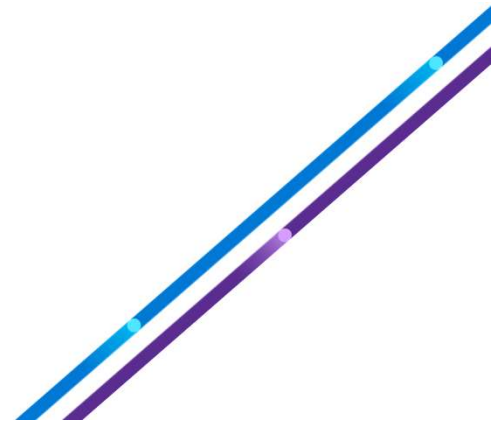
1. Can a formula contain more than one function?
2. What category of functions would you use to concatenate two text strings into one?



Context

How is DAX evaluated?

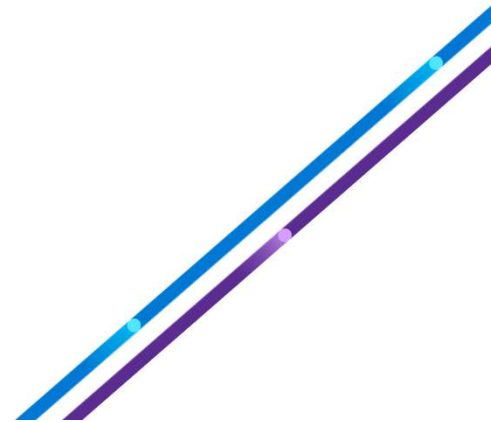
- Row context: In this context, calculations are evaluated row by row.
- Filter context: In this context, calculations are done after taking a subset of a data.



Task:

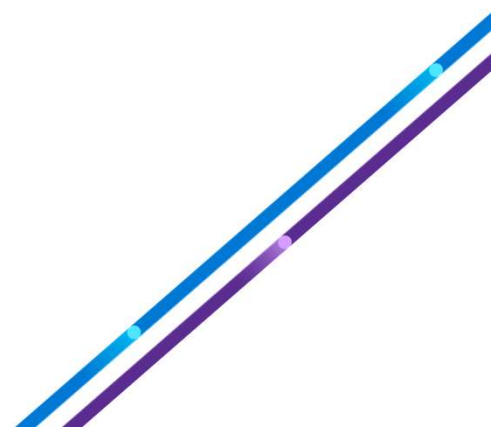
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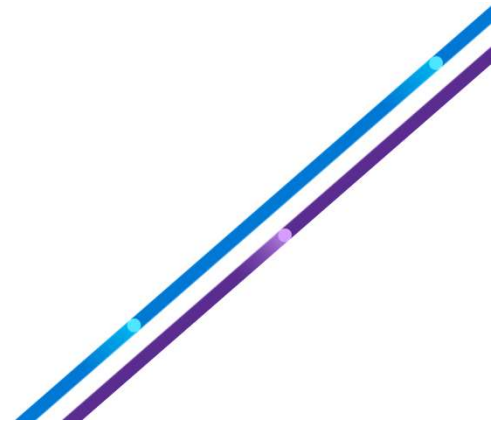


CALCULATE Function

Calculate function alters filter context, It's used in context transition



Q & A



Resources to learn more:

- Ms-Learn path : Use DAX in Power BI Desktop
- Data Modelling by Foresight BI Analytics
- Mastering DAX Foundations by Foresight BI Analytics
- Definitive Guide to DAX by Marco Russo.

