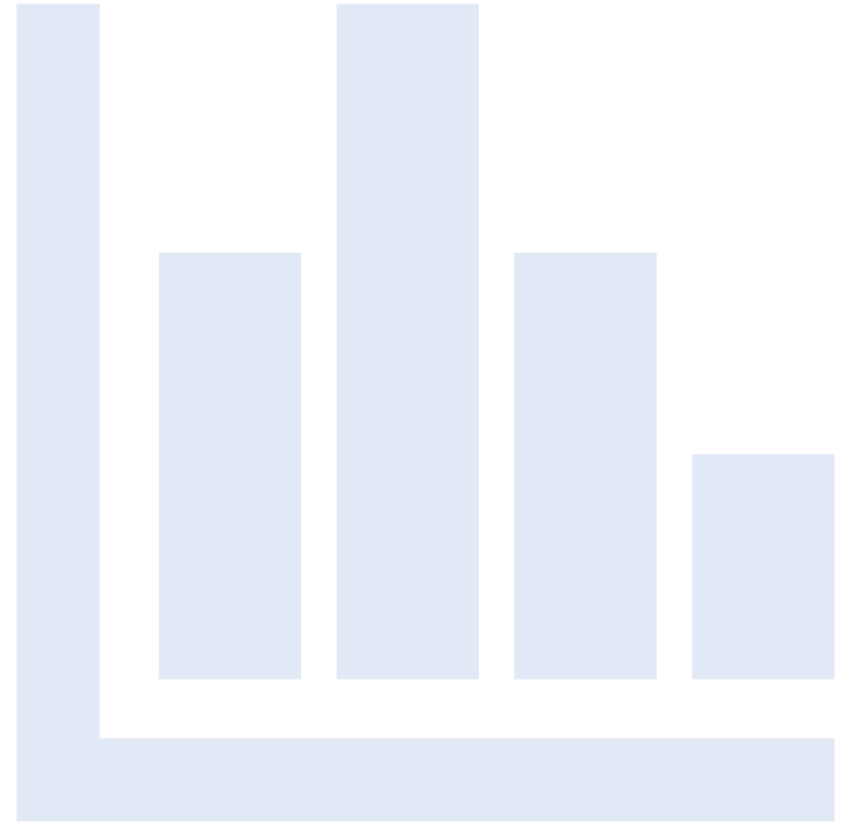# Power BI Masterclass

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Dialog

Course Overview

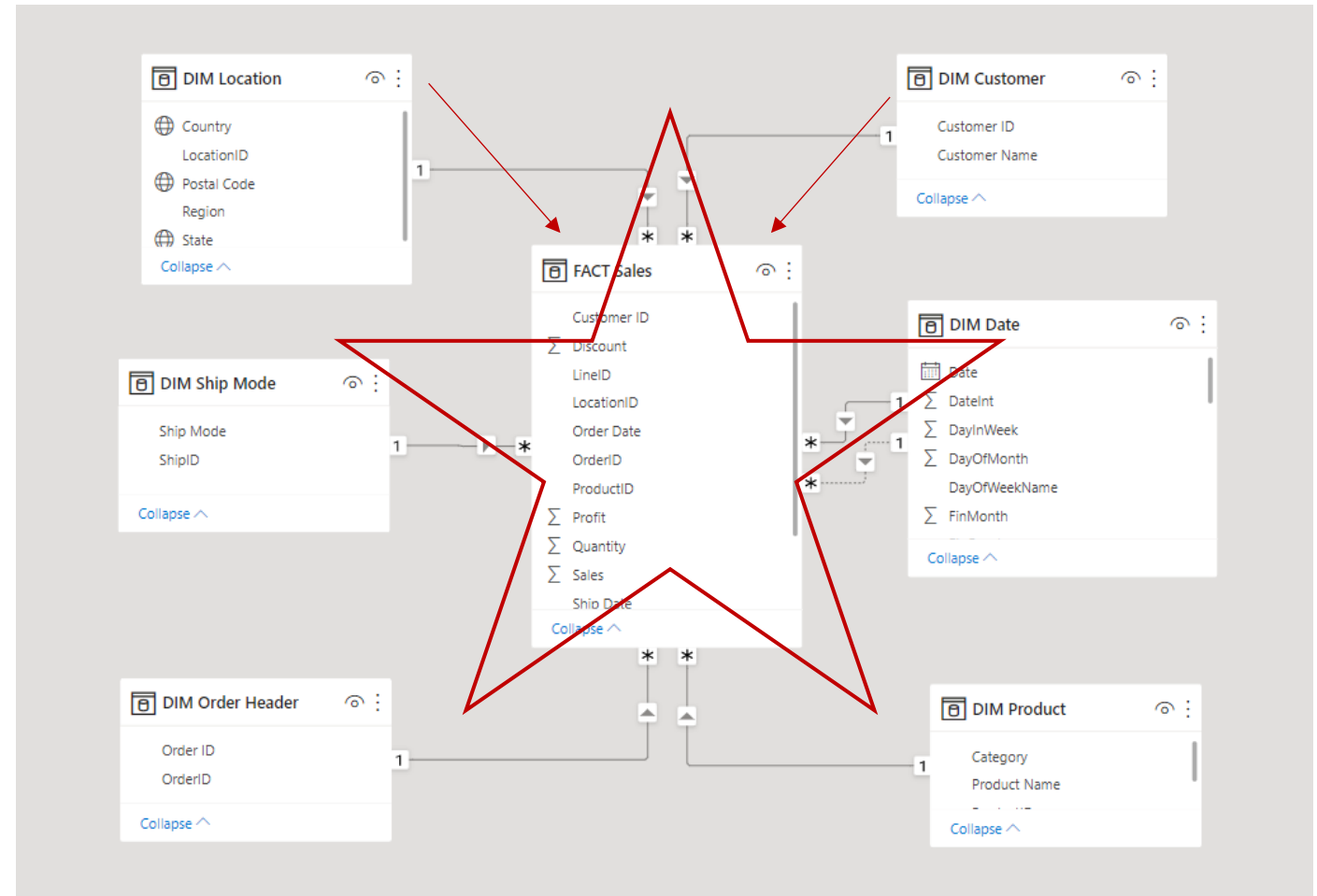Data Modeling Concepts

DAX with Practical Examples

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Designing a Data Model

Define Tables

- Fact tables
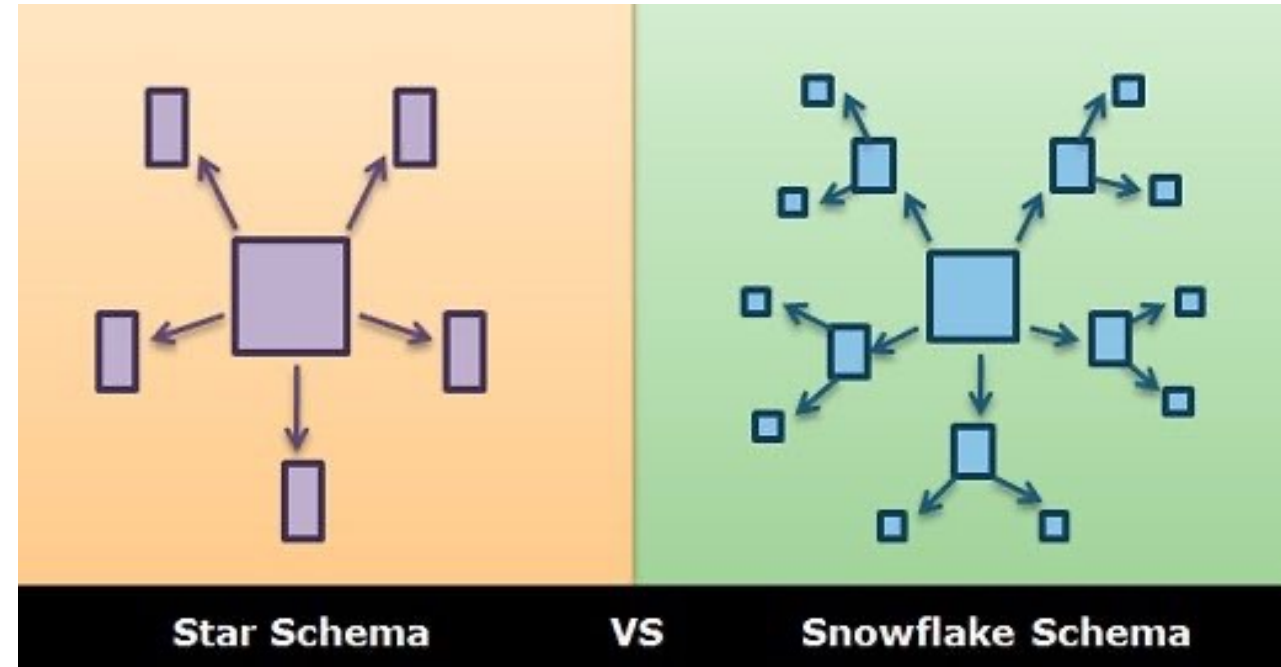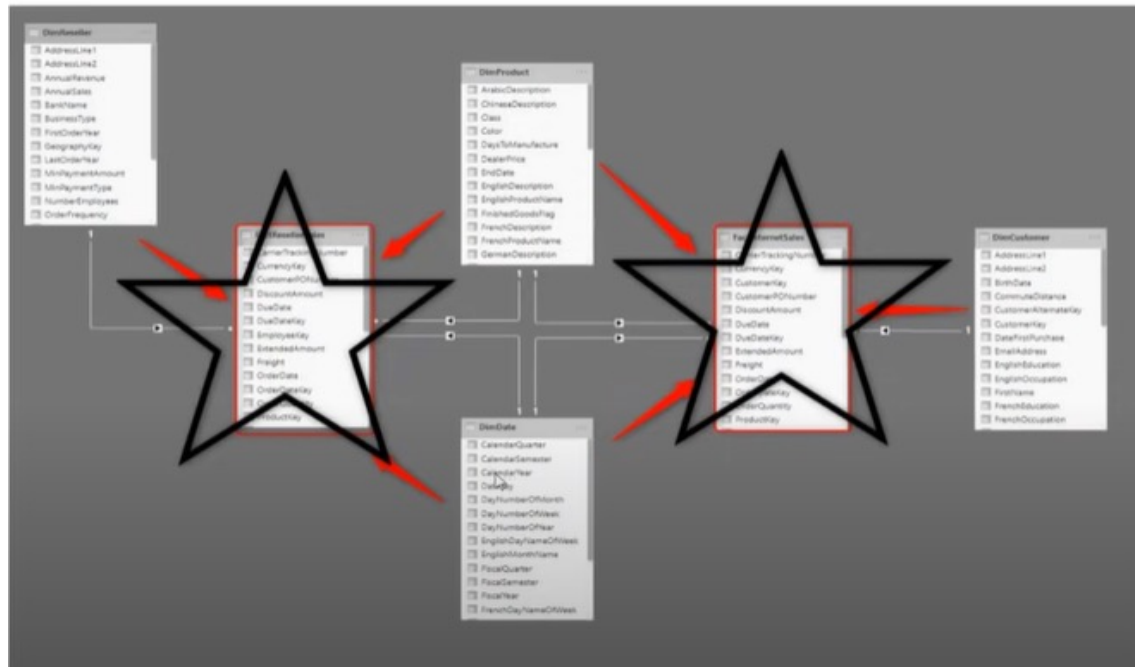- Dimension Tables

Build Relationships

- One-to-many
- From dimension to fact
- Single directional
- Star schema

Designing a Data Model

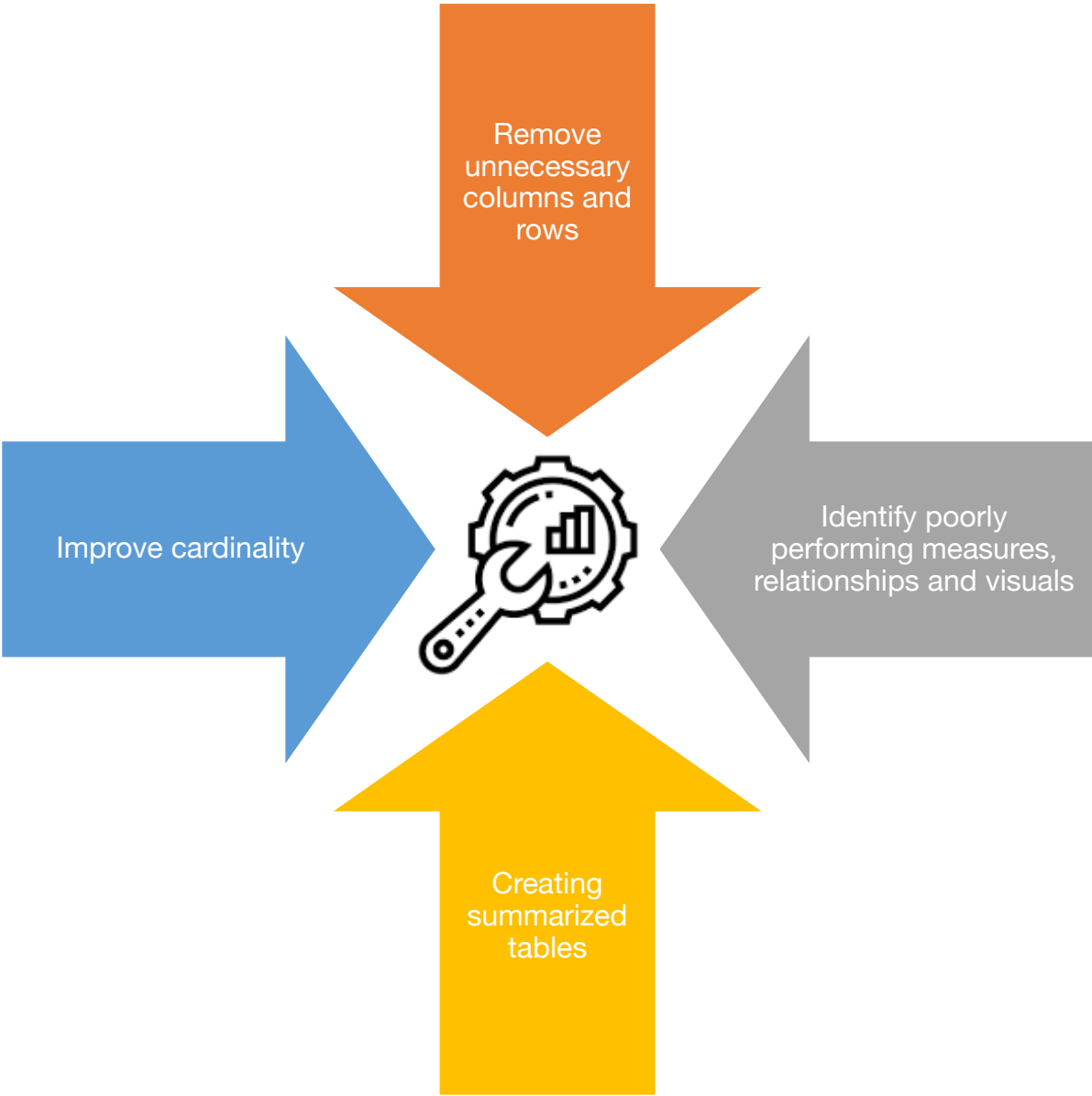Star Schema is not just one fact table !

Designing a Data Model

How to optimize a data model ?

Remove unnecessary columns and rows

Improve cardinality

Identify poorly performing measures, relationships and visuals

Creating summarized tables

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DAX

- Data Expression Language (DAX) is a library of functions and operators that can be combined to build formulas and expressions in Power BI.

- DAX allows you to add new columns and measures to enrich your data sources and open potential for new insights

- 3 ways to use DAX
  - Calculated columns
  - Calculated measures
  - Calculated Tables

- Where DAX can be used ?

  - Power BI
  - Power Pivot for Excel
  - SSAS Tabular Model
  - Azure Analysis Service

Calculated Columns vs Measures

Calculated Columns	Calculated Measures
Expands table by creating new columns	Summarizes data into a single value
Stored along with tables / Consume storage	Calculated at runtime / Consume RAM
Less analytical capabilities	Rich analytical capabilities
Calculated before aggregation	Calculated after the aggregation

New Product =

[Product Item]   & " − " & [Product Category]

Profit =

[Sales Amount] - [Cost Amount]
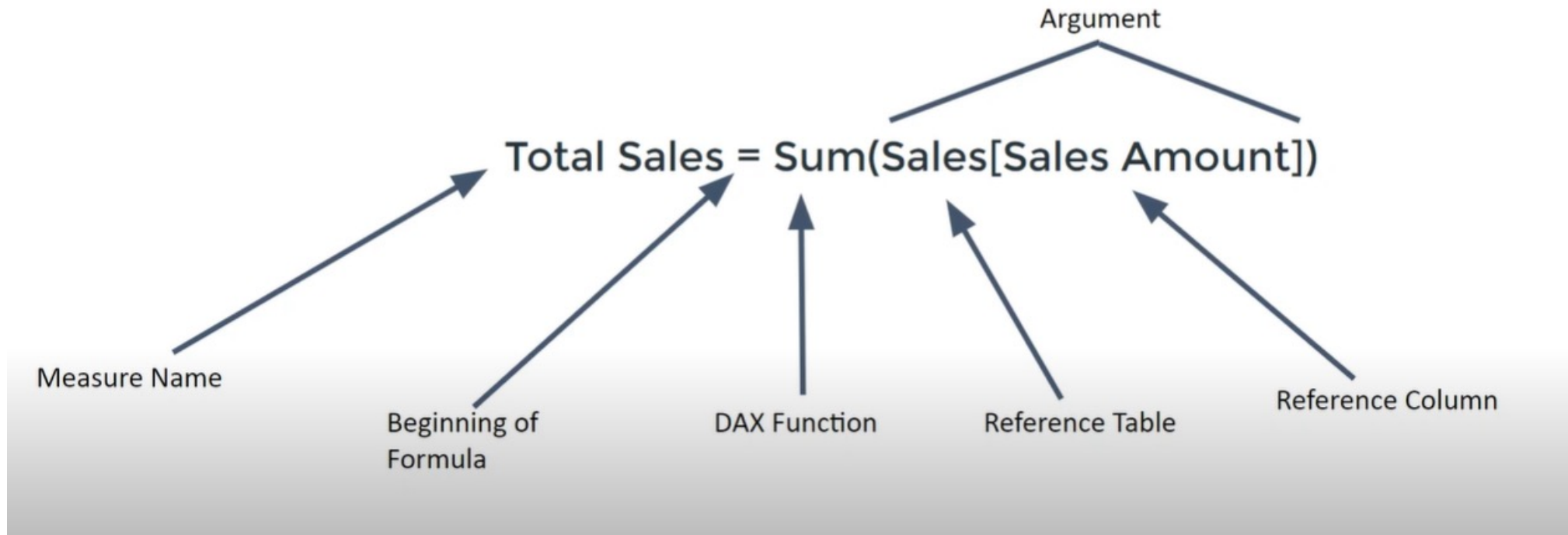
Total Sales = Sum([Sales Amount])

Total Profit =

Sum([Sales Amount]) - Sum([Cost Amount])

Prev Year Sale =

Calculate (Sum([Sales Amount]) ,

SAMEPERIODLASTYEAR ('Sale'[Date])

)

DAX Syntax

DAX Operators and Data Types

- Text
  - Customer name
  - Age
  - Color

- Whole number , Decimal
  - Quantity
  - Sales
  - Profit

- Date Time , Date , Time
  - Sales Date
  - Birthday
  - TimeUTC

- True / False
  - isValid
  - isTrue
  - Accepted

Operator Type	Symbol	Use	Example
Parenthesis	( )	Precedence order and grouping of arguments	(5 + 2) * 3
Arithmetic	+	Addition	4 + 2
	-	Subtraction/negation	6 - 3
	*	Multiplication	15 * 4
	/	Division	45 / 9
Comparison	=	Equal	[Country] = "USA"
	<>	Not equal to	[Country] <> "USA"
	>	Greater than	[Quantity] > 0
	>=	Greater than or equal to	[Quantity] >= 50
	<	Less than	[Quantity] < 0
	<=	Less than or equal to	[Quantity] <= 50
Text concatenation	&	Concatenation of strings	"Value is" & [Amount]
Logical	&&	AND condition between Boolean expressions	[Country] = "USA" && [Quantity] > 0
	||	OR condition between Boolean expressions	[Country] = "USA" || [Quantity] > 0
	!	NOT operator on the Boolean expression that follows	!([Country] = "USA")

Types of DAX Functions

- Aggregate Functions

- Date and Time Functions

- Time Intelligent Functions

- Filter Functions

- Financial Functions

- Information Functions

- Logical Functions

- Math and Trig Functions

- Other Functions

- Parent and Child Functions

- Relationship Functions

- Statistical Functions

- Table Manipulation Functions

- Text Functions

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SUM , SUMX

- SUMX - Returns the sum of an expression evacuated for each row in a table

- SUM - Adds all the numbers in a column. Does not require row by row operation

What is CALCULATE function ?

CALCULATE , ALL

- Compare total sales with main branch (united sales) sales ?

- How much % each location is contributing to my sales ?

Time Intelligent Functions

TOTALMTD, TOTALQTD, TOTALYTD

- What is cumulative sales quantity over Month, Quarter, Year ?

- What is Financial Year cumulative sales quantity ?

SAMEPERIODLASTYEAR

Returns a table that contains a column of dates shifted one year back in time from the dates in the specified dates column, in the current context.

- How is my current year sales performing over last year ?

Time Intelligent Functions

PREVIOUSMONTH, PREVIOUSYEAR, PREVIOUSDAY, PREVIOUSQUARTER

- How my products performing comparing to last month ?
- How my products performing comparing to last year ?
- How my products performing comparing to last day ?
- How my products performing comparing to last quarter ?

DATEADD

Returns a table that contains a column of dates, shifted either forward or backward in time by the specified number of intervals from the dates in the current context.

- What is my sales compared to 14 days ago ?

- What is my current sales compared to my business started year ?

Time Intelligent Functions

DATESINPERIOD, LASTDATE

- How to calculate 3 month cumulative / moving average of sales ?

- How to calculate 6 month cumulative / moving average of sales ?

Filter Functions

ALL , ALLEXCEPT

- Creating a reference table

- How much each category is contributing to total sales ?

- How much each category is contributing to total sales for each country ?

Filter Functions

CALCULATE

- Compare total sales with main branch (united sales) sales ?

- How much % each location is contributing to my sales ?

Filter Functions

LOOKUPVALUE

- Compare my product prices with competitor prices ?

Filter Functions

SELECTEDVALUE

- Display monthly sales which allows to see all sales figures that occurred before a selected month ?

Logical Functions

IF , NESTEDIF, SWITCH

Logical functions can be used to check the result of an expression and create conditional results

Relationship Functions

CROSSFILTER , USERRELATIONSHIP

Used to manage and utilize relationships between tables