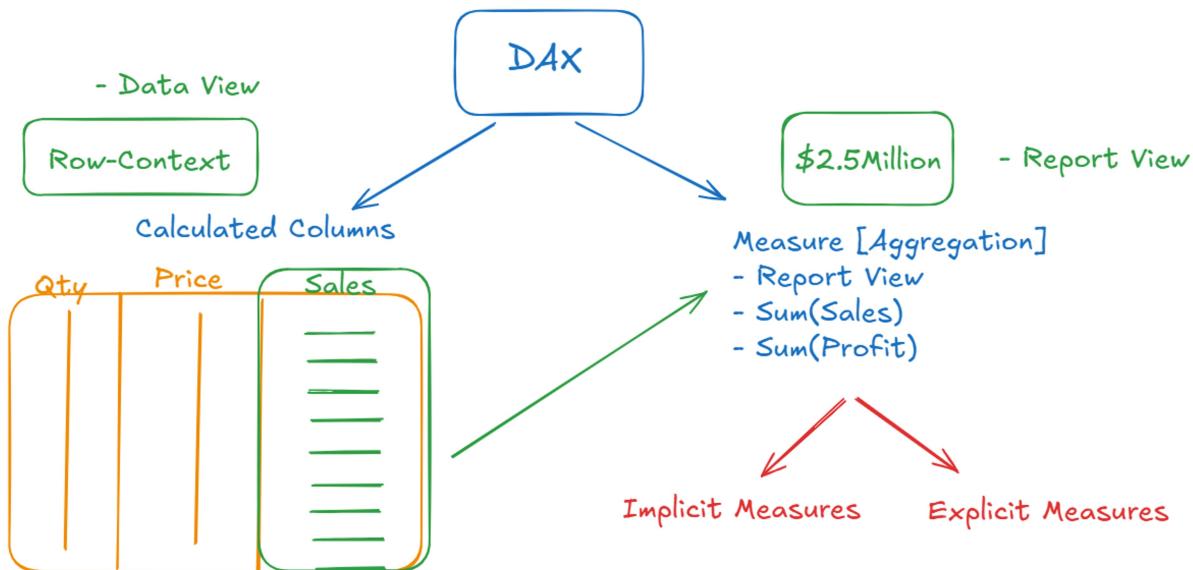


## DAX Functions

- What is DAX.
- DAX Vs M-Code.
- Calculated Column Vs Measure.
- Implicit Measure Vs Explicit Measure.
- Filter Context Vs Row Context.
- Different Categories of DAX Functions.
- Understanding the Syntax of Formula Language.

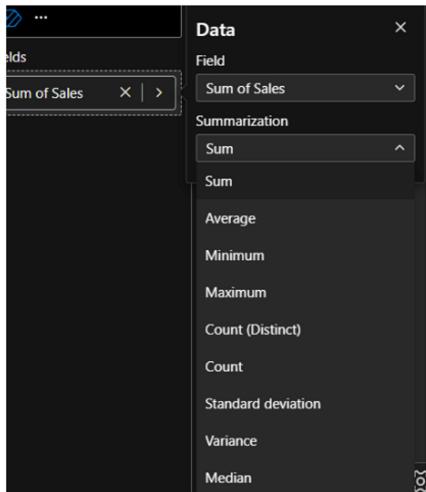


- It's a formula language that helps you to create KPIs & Matrices that gives more insights to the Investor, Audience, Executive Managers to get the health of the business.



# \$518.81K

Sum of Sales



## MEET DAX

Data Analysis Expressions (commonly known as DAX) is the formula language that drives the Power BI front-end. With DAX, you can:

- Go beyond the capabilities of traditional spreadsheet formulas, with powerful and flexible functions built specifically to work with relational data models.
- Add calculated columns (for filtering) and measures (for aggregation) to enhance data models.



## M VS. DAX

M and DAX are two distinct functional languages used within Power BI Desktop:

- M is used in the Power Query editor, and is designed specifically for extracting, transforming and loading data.
- DAX is used in the Power BI front-end, and is designed specifically for analyzing relational data models

## CALCULATED COLUMNS

Calculated columns allow you to add new, formula-based columns to tables in a model

- Calculated columns refer to entire tables or columns (no A1-style cell references).
- Calculated columns generate values for each row, which are visible within tables in the Data view.
- Calculated columns understand row context; they're great for defining properties based on information in each row, but generally useless for aggregation (sum, count, etc.)

Row Context

### HEY THIS IS IMPORTANT!

As a rule of thumb, use calculated columns to "stamp" static, fixed values to each row in a table (or go upstream and use the Query Editor!) DO NOT use calculated columns for aggregation – this is what measures are for!

1 Sales = 'Sales DAX'[Quantity Ordered] * 'Sales DAX'[Price of Item]						
Customer ID	Customer Region	Customer Age	Quantity Ordered	Price of Item	Sales	
21	North	10	24	\$272	\$6,532	
22	North	23	19	\$419	\$7,958	
23	South	56	30	\$34	\$1,012	
24	East	38	12	\$485	\$5,816	

1 Revenue = SUM('Sales DAX'[Sales])						
Customer ID	Customer Region	Customer Age	Quantity Ordered	Price of Item	Sales	Revenue
21	North	10	24	\$272	\$6,532	\$50,8681
22	North	23	19	\$419	\$7,958	\$50,8681
23	South	56	30	\$34	\$1,012	\$50,8681
24	East	38	12	\$485	\$5,816	\$50,8681
25	East	22	14	\$404	\$5,651	\$50,8681
26	West	22	7	\$459	\$3,215	\$50,8681
27	West	58	28	\$297	\$8,314	\$50,8681
28	East	15	15	\$220	\$3,300	\$50,8681

### PRO TIP:

Calculated columns are typically used for filtering & grouping data, rather than creating aggregate numerical values

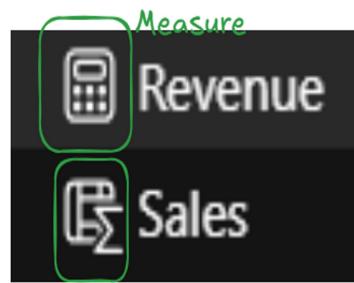
## DAX MEASURES

Measures are DAX formulas used to generate new calculated values

- Like calculated columns, measures reference entire tables or columns (no A1-style cell references).
- Unlike calculated columns, measures aren't visible within tables; they can only be "seen" within a visualization like a chart or matrix (similar to a calculated field in a PivotTable).
- Measures evaluate based on filter context, which means they recalculate when the fields or filters around them change.

### HEY THIS IS IMPORTANT!

As a rule of thumb, use measures when a single row can't give you the answer, or when you need to aggregate values across multiple rows in a table



calculated Column

### PRO TIP:

Use measures to create numerical, calculated values that can be analyzed in the "values" field of a report visual

```
Revenue = SUM('Sales DAX'[Sales])
```

## IMPLICIT VS. EXPLICIT MEASURES

Implicit

Implicit measures are created when you drag raw numerical fields into a report visual and manually select an aggregation mode (Sum, Average, Min, Max, Count, etc.)

\$508.68K

Sum of Sales

Explicit measures are created when you actually write a DAX formula and define a new measure that can be used within the model

\$508.68K

Revenue

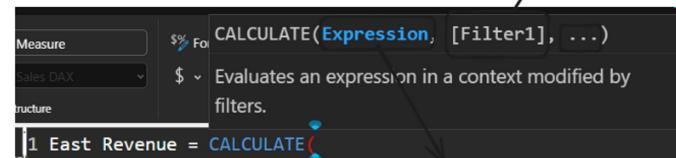
Explicit

Customer Region = "East"

### HEY THIS IS IMPORTANT!

Implicit measures are only accessible within the specific visualization in which they were created, and cannot be referenced elsewhere.

Explicit measures can be used anywhere in the report, and referenced by other DAX calculations to create "measure trees".



Existing Measure  
[Revenue]

## RECAP: CALCULATED COLUMNS VS. MEASURES

### CALCULATED COLUMNS

### MEASURES

- Values are calculated based on information from each row of a table (row context)

- Appends static values to each row in a table and stores them in the model (which increases file size)

- Recalculate on data source refresh or when changes are made to component columns

- Primarily used for filtering data in reports

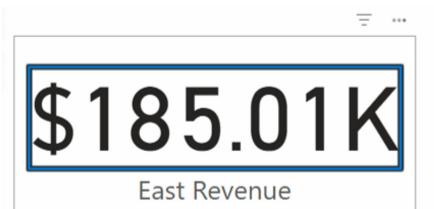
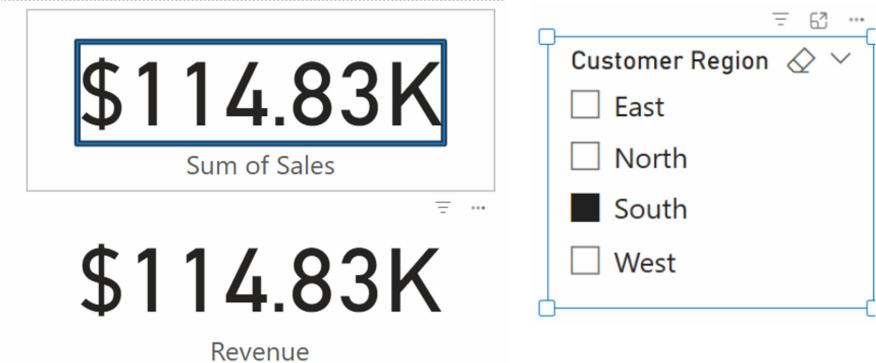
- Values are calculated based on information from any filters in the report (filter context)

- Does not create new data in the tables themselves (doesn't increase file size)

- Recalculate in response to any change to filters within the report

- Primarily used for aggregating values in report visuals

Revenue = SUM('Sales DAX'[Sales])



East Revenue = CALCULATE([Revenue], 'Sales DAX'[Customer Region] ="East")

\$143.89K

North Revenue

North Revenue = CALCULATE([Revenue], 'Sales DAX'[Customer Region] ="North")

Customer ID Customer Region Customer Age Quantity Ordered Price of Item

1	21	North	10	272.17
2	22	North	23	418.84
3	23	South	56	33.73
4	24	East	38	484.67
5	25	East	22	403.64
6	26	West	22	459.29
7	27	West	58	296.93
8	28	East	11	238.33
9	29	East	43	1,491.80
10	30	North	45	84.58
11	31	North	14	405.20
12	32	South	27	3,021.67
13	33	East	57	260.18
14	34	East	17	32.69
15	35	East	53	154.21
16	36	East	59	1,957.67
17	37	North	49	151.21
18	38	North	33	415.70
19	39	South	38	232.20
20	40	East	59	406.75
21	41	North	18	1,538.50

Properties

- Name: Sales DAX
- All Properties

Applied Steps

- Source
- Navigation
- Promoted Headers
- Changed Type
- Filtered Rows

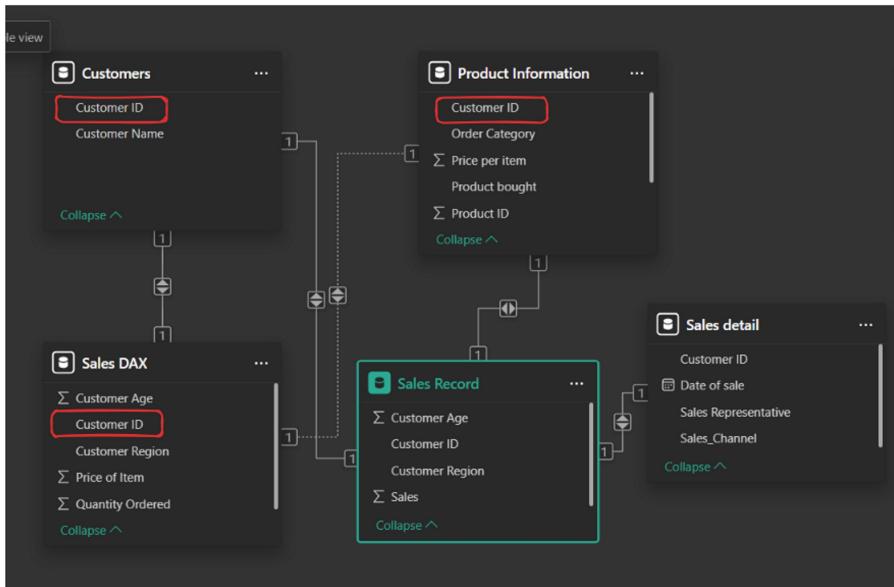


Table view showing sales data:

Customer ID	Customer Region	Customer Age	Quantity Ordered	Price of Item
21	North	10	24	\$272.1667
22	North	23	19	\$418.8421
23	South	56	30	\$33.7333
24	East	38	12	\$484.6667
25	East	22	14	\$403.6429
26	West	22	7	\$459.2857
27	West	58	28	\$296.9286
28	East	11	15	\$238.3333
29	East	43	5	\$1,491.8
30	North	45	19	\$84.5789
31	North	14	15	\$405.2
32	South	27	3	\$3,021.6667
33	East	57	17	\$260.1765
34	East	17	26	\$32.6923
35	East	53	24	\$154.2083
36	East	59	3	\$1,957.6667
37	North	49	29	\$151.2069
38	North	33	23	\$415.6957

Data context menu open on the table:

- New measure
- New column
- New quick measure
- Refresh data
- Edit query
- Manage relationships
- Incremental refresh
- Manage aggregations
- Copy table
- Rename

Table view showing sales data with a new column:

Customer Region	Customer Age	Quantity Ordered	Price of Item	Column
North	10	24	\$272.1667	
North	23	19	\$418.8421	
South	56	30	\$33.7333	
East	38	12	\$484.6667	
East	22	14	\$403.6429	
West	22	7	\$459.2857	
West	58	28	\$296.9286	
East	11	15	\$238.3333	
East	43	5	\$1,491.8	

```
Sales = 'Sales DAX'[Quantity Ordered] * 'Sales DAX'[Price of Item]
```

1 Sales = 'Sales DAX'[Quantity Ordered] * 'Sales DAX'[Price of Item]					
	Customer Region	Customer Age	Quantity Ordered	Price of Item	Sales
21	North	10	24	\$272.1667	\$6,532.0008
22	North	23	19	\$418.8421	\$7,957.9999
23	South	56	30	\$33.7333	\$1,011.9999
24	East	38	12	\$484.6667	\$5,816.0004
25	East	22	14	\$403.6429	\$5,651.0006
26	West	22	7	\$459.2857	\$3,214.9999
27	West	58	28	\$296.9286	\$8,314.0008
28	East	11	15	\$238.3333	\$3,574.9995
29	East	43	5	\$1,491.8	\$7,459
30	North	45	19	\$84.5789	\$1,606.9991
31	North	14	15	\$405.2	\$6,078
32	South	27	3	\$3,021.6667	\$9,065.0001
33	East	57	17	\$260.1765	\$4,423.0005
34	East	17	26	\$32.6923	\$849.9998
35	East	53	24	\$154.2083	\$3,700.9992
36	East	59	3	\$1,957.6667	\$5,873.0001
37	North	49	29	\$151.2069	\$4,385.0001
38	North	33	23	\$415.6957	\$9,561.0011
39	South	38	10	\$232.2	\$2,322
40	East	59	12	\$406.75	\$4,881
41	North	18	4	\$1,538.5	\$6,154
42	North	36	28	\$334.1071	\$9,354.9988
43	South	31	21	\$120.7619	\$2,535.9999
44	East	50	3	\$399.3333	\$1,197.9999
45	East	52	6	\$1,557.1667	\$9,343.0002
46	West	11	15	\$553.0667	\$8,296.0005
47	West	21	7	\$230	\$1,610
48	East	42	28	\$175.4286	\$4,912.0008
49	East	27	21	\$209.1429	\$4,392.0009

Rows: 49 Columns: 6 (100% of table length)