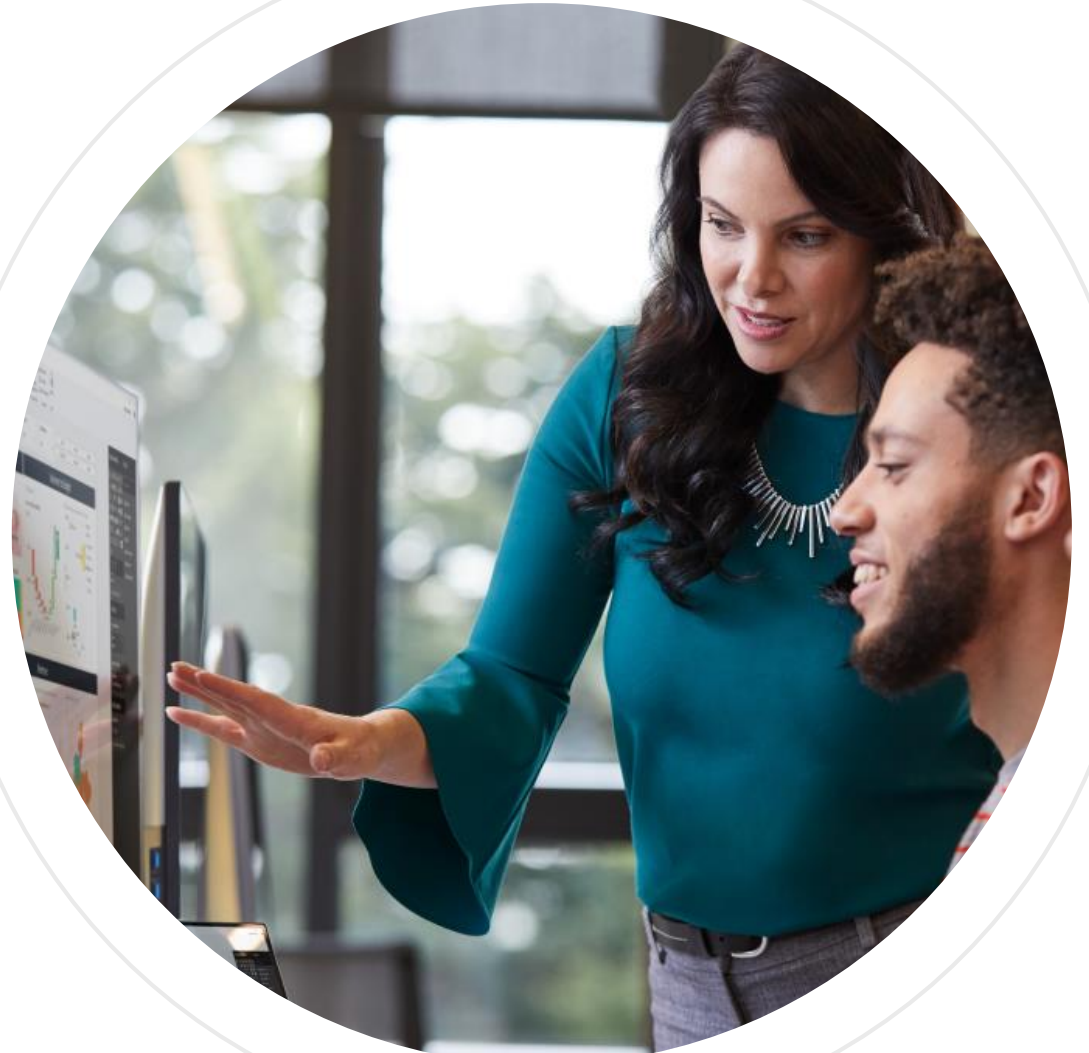


Module 5: Create Model Calculations using DAX in Power BI

Mohammed Arif



Learning Objectives

You will learn the following concepts:

- DAX
- Measures
- Calculated columns
- Context
- Time-Intelligence

Module Agenda



Introduction to DAX



DAX Context



Advanced DAX

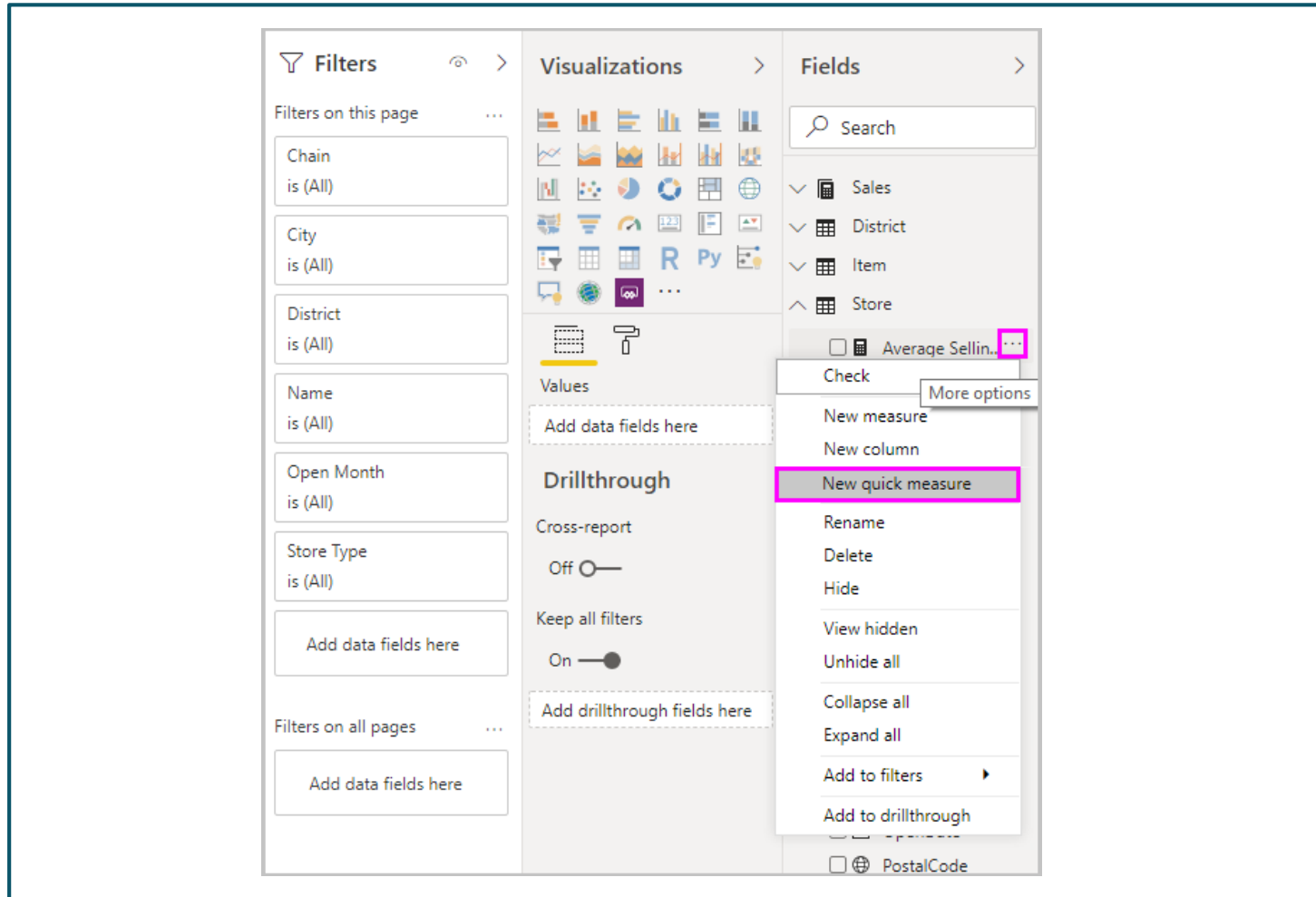
Lesson 1: Introduction to DAX



Introduction to DAX

- Data Analysis Expressions (DAX).
- Developed by Microsoft.
- A library of functions and operators.
- Build formulas and expressions.
- Create calculated tables, columns, and measures.

Measures



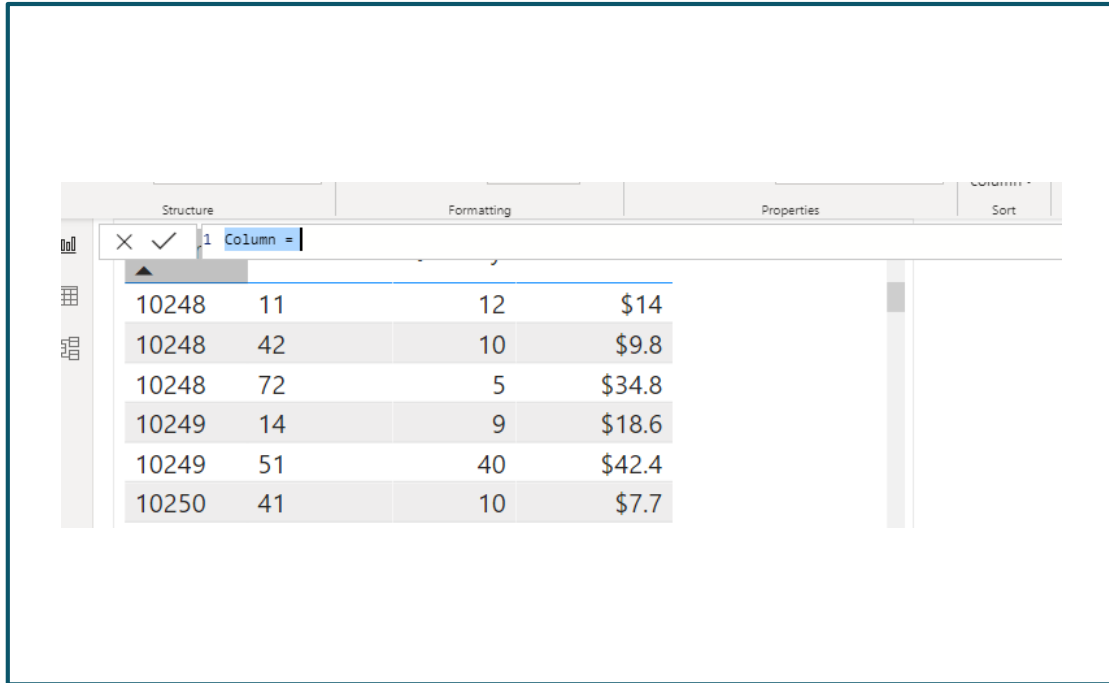
Measures:

Measures are a summarization of data.

A way of defining aggregate calculations on data.

Often called "Calculated Measures".

Calculated Columns



The screenshot shows a software interface with a table and a formula bar. The formula bar contains the text "Column =". The table below it has the following data:

Order ID	Product ID	Quantity	Unit Price	Total Price
10248	11	12	\$14	
10248	42	10	\$9.8	
10248	72	5	\$34.8	
10249	14	9	\$18.6	
10249	51	40	\$42.4	
10250	41	10	\$7.7	

**Total Price = 'Sales
OrderDetails'[Quantity] * 'Sales
OrderDetails'[Unit Price]**



The screenshot shows a software interface with a table. The table has the following data:

Order ID	Product ID	Quantity	Unit Price	Total Price
10248	11	12	\$14	\$168
10248	42	10	\$9.8	\$98
10248	72	5	\$34.8	\$174
10249	14	9	\$18.6	\$167.4
10249	51	40	\$42.4	\$1,696
10250	41	10	\$7.7	\$77
10250	51	35	\$42.4	\$1,484
10250	65	15	\$16.8	\$252
10251	22	6	\$16.8	\$100.8
10251	57	15	\$15.6	\$234
10251	65	20	\$16.8	\$336
10252	20	40	\$64.8	\$2,592
10252	33	25	\$2	\$50
10252	60	40	\$27.2	\$1,088

Columns vs. Measures

- Calculated column creates a value for each row in a table.
- Calculated column creates a value for each row in a table.
- Measures are calculated on demand.
- Measures are calculated based on filters.

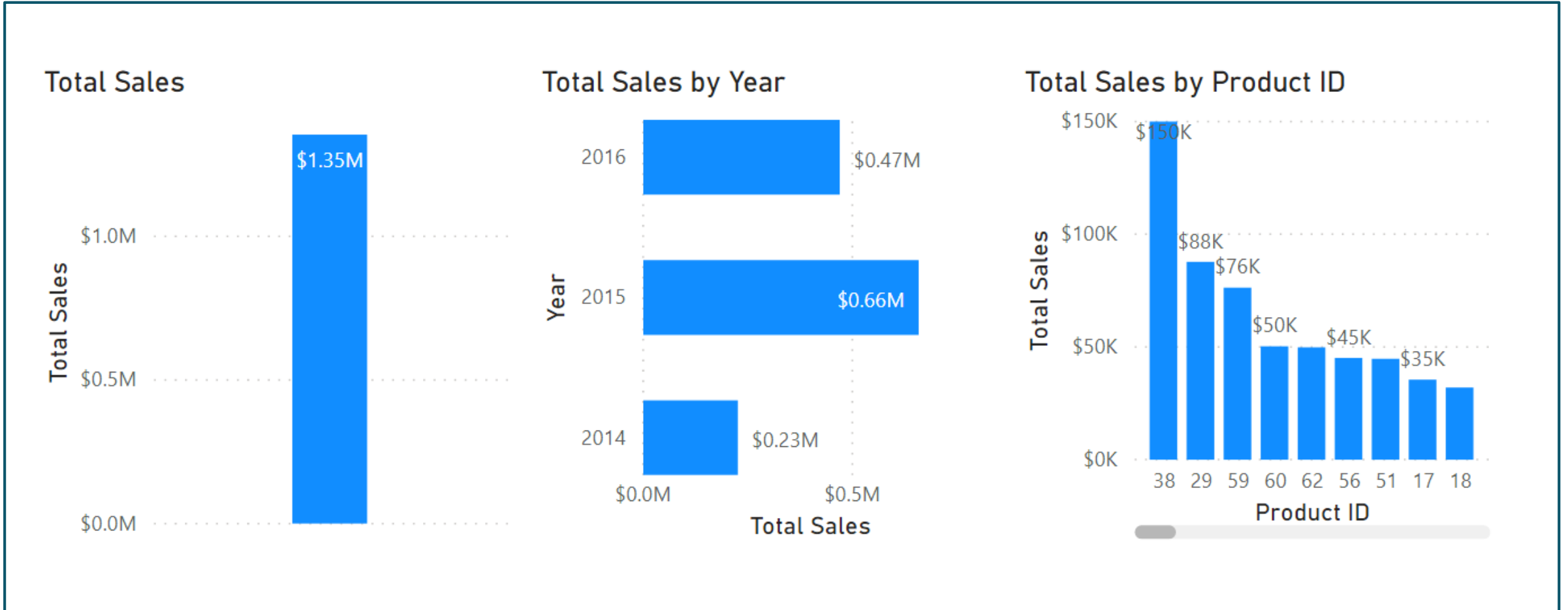
Review Questions

- **Q01 – Which are calculated on demand? Calculated columns or Measures?**
 - A01 – Measures
- **Q02 – Which are based on filters? Calculated columns or Measures based?**
 - A02 – Measures

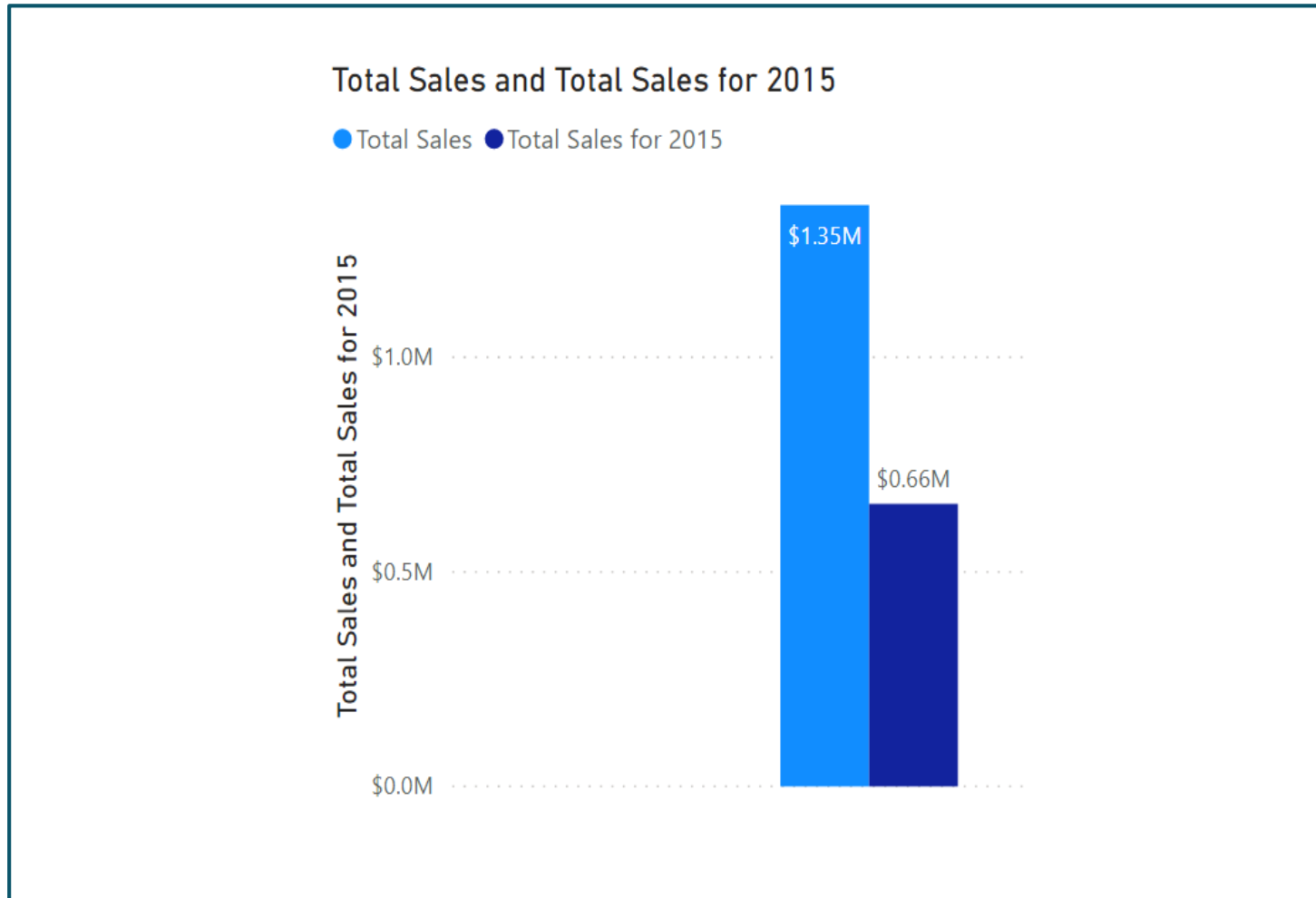
Lesson 2: Real-time Dashboards



Understanding Context



The CALCULATE() Function



Total Sales for 2015 =
CALCULATE(
SUM('Sales OrderDetails'[Total
Price]),
YEAR('Sales
OrderDetails'[orderdate]) = 2
015)

The above are Expression and
Filter Context.

Review Questions

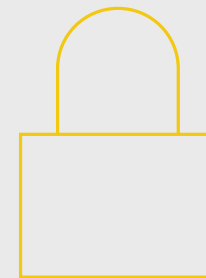
- **Q01 – Which DAX function evaluates an expression in a modified filter context?**
 - A01 – CALCULATE
- **Q02 – Why would you want to override the default context?**
 - A02 – To create measures that behave according to your intentions, regardless of what the user selects.

Lab: Create DAX Calculations in Power BI Desktop, Part 1

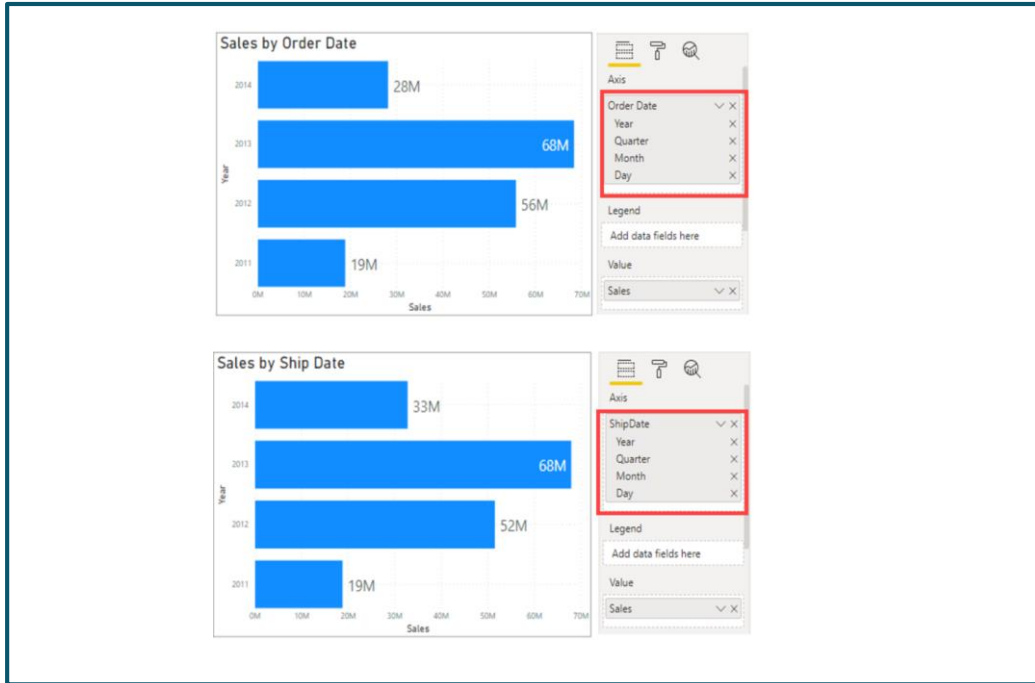
Lab: Create DAX Calculations
in Power BI Desktop, Part 1



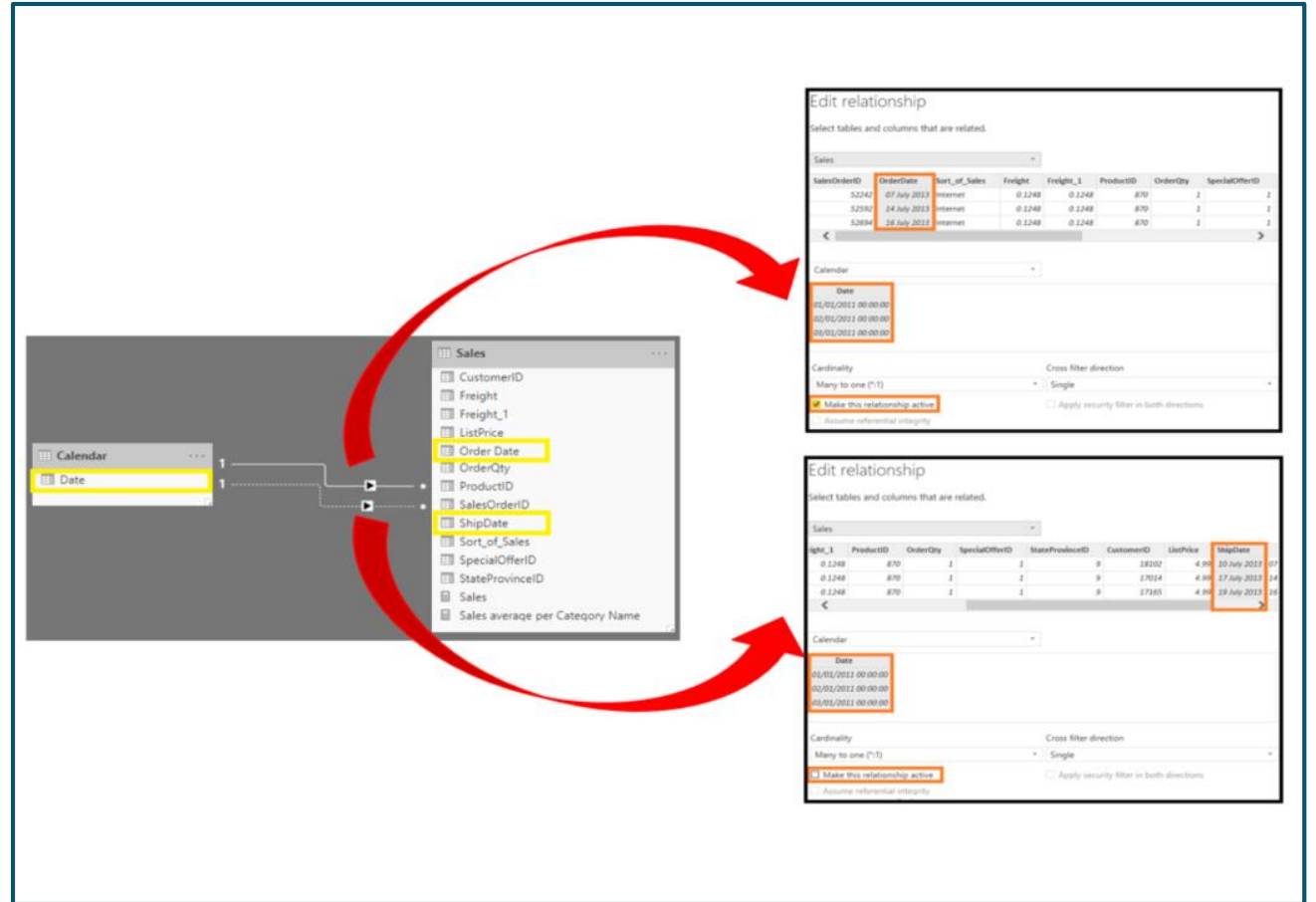
Lesson 3: Advanced DAX



Using Relationships Effectively



Sales by Ship Date = CALCULATE(Sales[TotalPrice],
USERRELATIONSHIP('Calendar'[Date],Sales[ShipDate]))



Semi-additive Measures

- Use SUM() to aggregate over one set of dimensions while using different aggregations over other dimensions.
- Commonly used over Time dimensions.
- Ex: calculating inventory each month.

```
Last Inventory Count =  
    CALCULATE  
(  
    SUM ( 'Warehouse'[Inventory Count] ),  
    LASTDATE ( 'Date'[Date] )  
)
```

Time-Intelligence

Month	2014	2015	2016
January		\$66,692.8	\$100,854.72
February		\$107,900	\$205,416.67
March		\$147,879.9	\$315,242.12
April		\$203,579.29	\$449,872.68
May		\$260,402.99	\$469,771.34
June		\$299,490.99	\$469,771.34
July	\$30,192.1	\$354,955.92	\$469,771.34
August	\$56,801.5	\$404,937.61	\$469,771.34
September	\$84,437.5	\$464,670.63	\$469,771.34
October	\$125,641.1	\$534,999.13	\$469,771.34
November	\$175,345.1	\$580,912.49	\$469,771.34
December	\$226,298.5	\$658,388.75	\$469,771.34
Total	\$226,298.5	\$658,388.75	\$469,771.34

Year	Month	Total Sales	Total Sales Previous Month
2015	March	\$39,979.9	\$41,207.2
2015	April	\$55,699.39	\$39,979.9
2015	May	\$56,823.7	\$55,699.39
2015	June	\$39,088	\$56,823.7
2015	July	\$55,464.93	\$39,088
2015	August	\$49,981.69	\$55,464.93
2015	September	\$59,733.02	\$49,981.69
2015	October	\$70,328.5	\$59,733.02
2015	November	\$45,913.36	\$70,328.5
2015	December	\$77,476.26	\$45,913.36

Total Sales Previous Month = CALCULATE

```
(  
    SUM('SalesOrderDetails'[Total price])  
    , PREVIOUSMONTH(Dates[Date])  
)
```

Review Questions

- **Q01 – What type of Measure uses SUM to aggregate over one set of dimensions and a different aggregation over a different set of dimension?**
 - A01 – Semi-additive
- **Q02 – What type of functions enable you to manipulate data using time periods?**
 - A02 – Time intelligence
- **Q03 – Which two functions will help you compare dates to the previous month?**
 - A03 – CALCULATE and PREVIOUSMONTH

Lab: Create DAX Calculations in Power BI Desktop, Part 2

Lab: Create DAX Calculations
in Power BI Desktop, Part 2



Module Overview

We covered the following concepts:

- DAX
- Measures
- Calculated columns
- Context
- Time-Intelligence

References

PL-300 Introduction to creating measures using DAX in Power BI

<https://docs.microsoft.com/en-us/learn/modules/create-measures-dax-power-bi/>

