

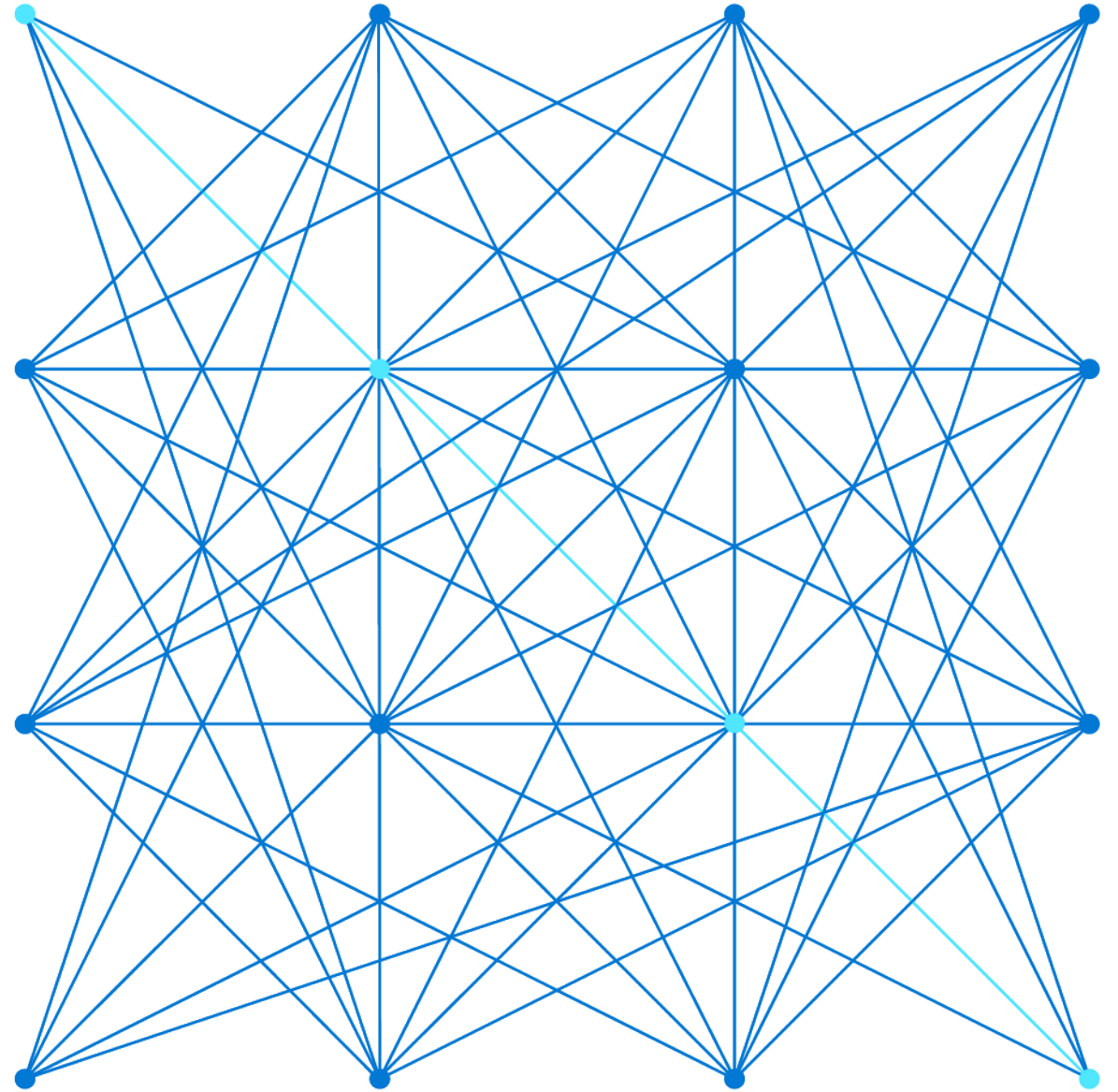
Online Role-based training resources:

**Microsoft Learn**

<https://docs.microsoft.com/en-us/learn/>

# DA-100 Analyzing Data with Power BI

<Name>, <Title>



# **Module 5: Create Model Calculations using DAX in Power BI**

# Learning Objectives

You will learn the following concepts:

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





# Lesson 1: Introduction to DAX

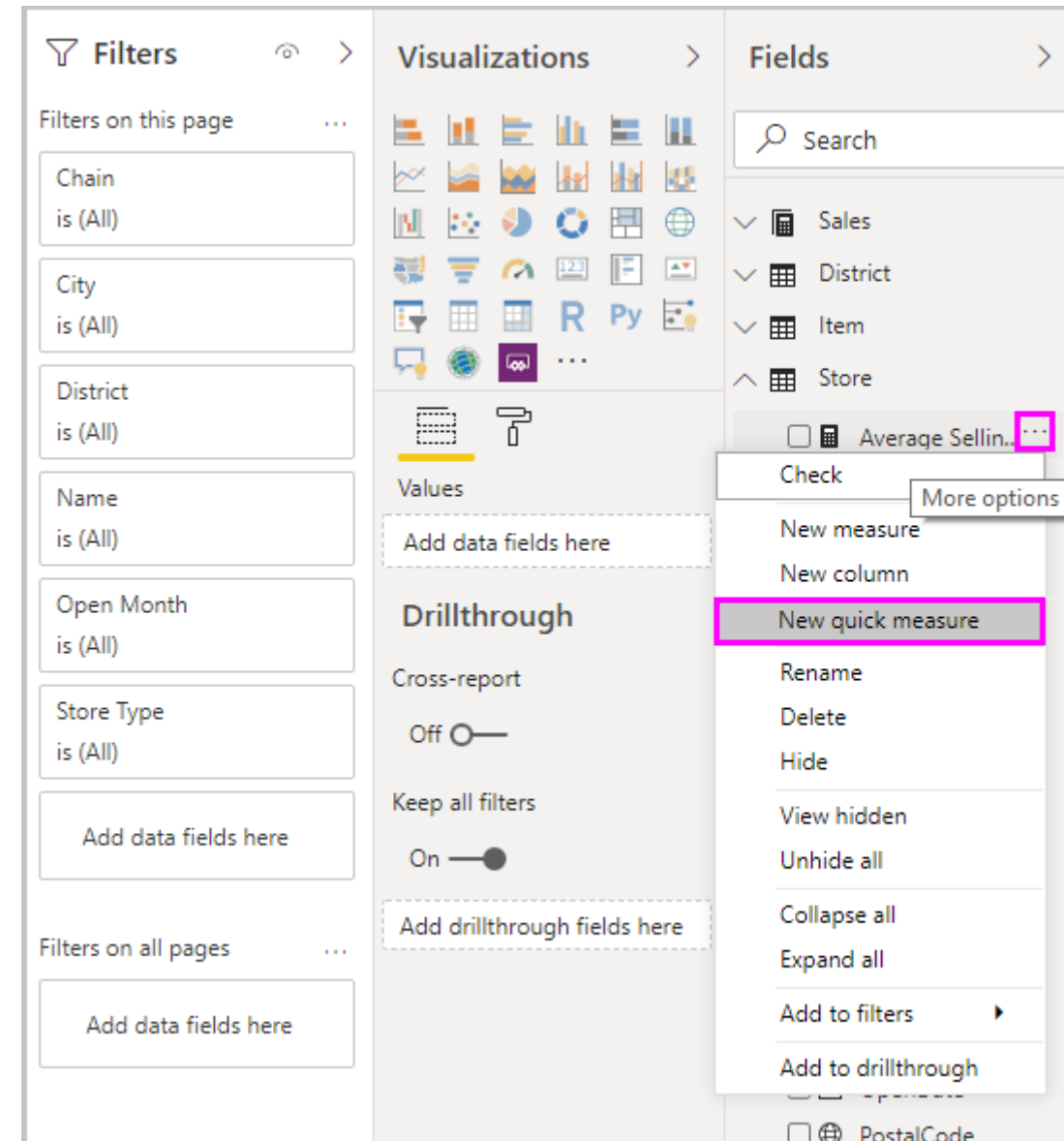


# Introduction to DAX

- 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 are a summarization of data.
- A way of defining aggregate calculations on data.
- Often called "Calculated Measures".



# Calculated Columns

Structure	Formatting	Properties	Sort
1	Column =		
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

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

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



# Columns vs. Measures

- Calculated column creates a value for each row in a table.
- Calculated column values are stored in the Power BI .pbix file.
- 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?
- A01 – Measures



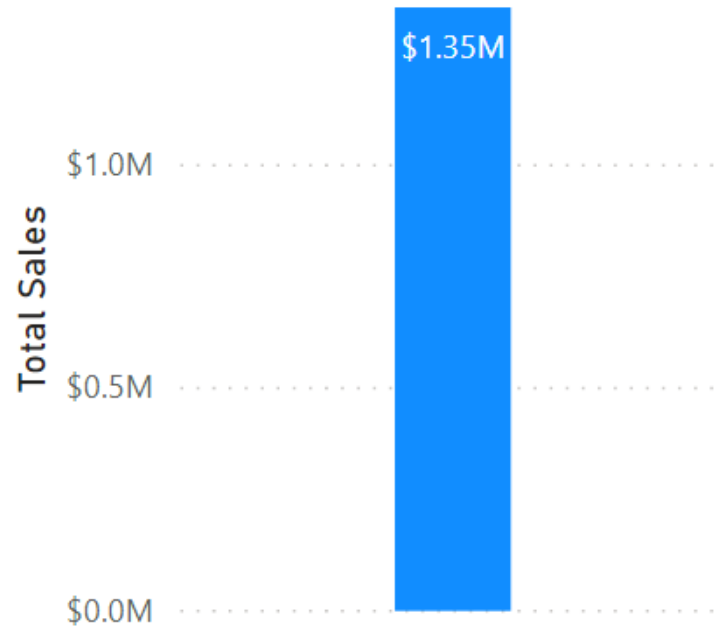


# Lesson 2: DAX Content

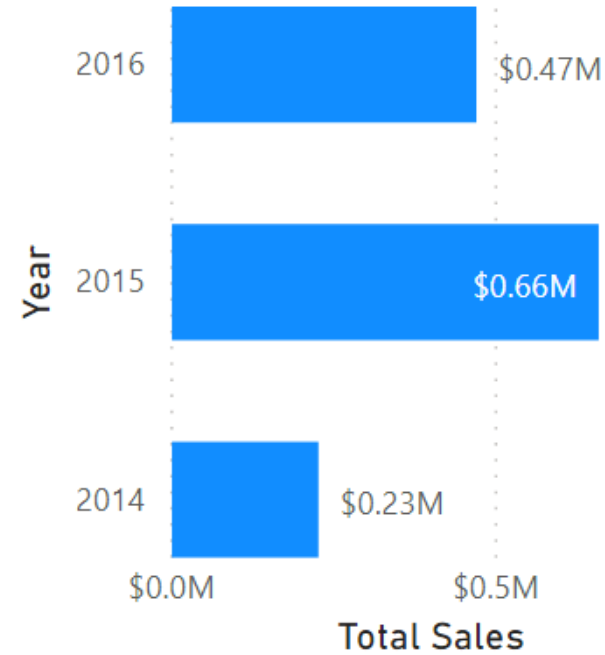


# Understanding Context

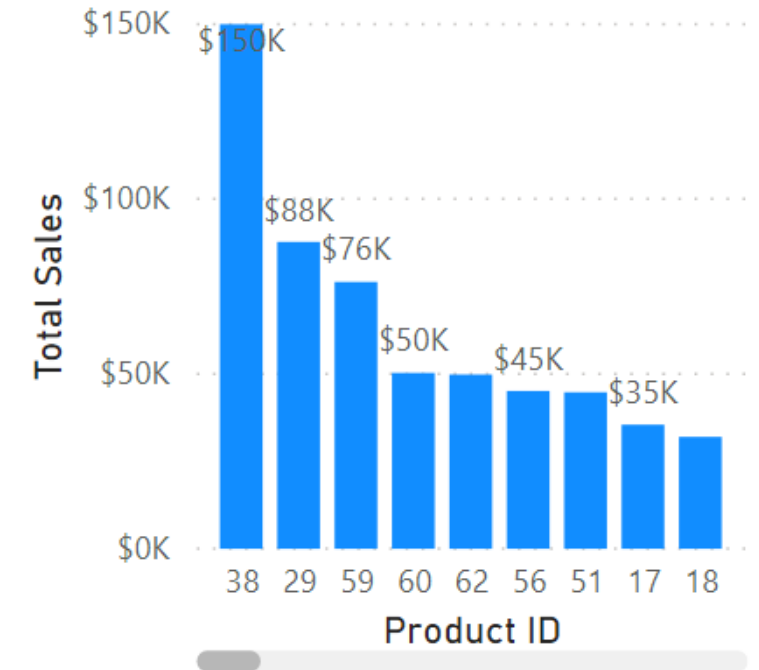
Total Sales



Total Sales by Year



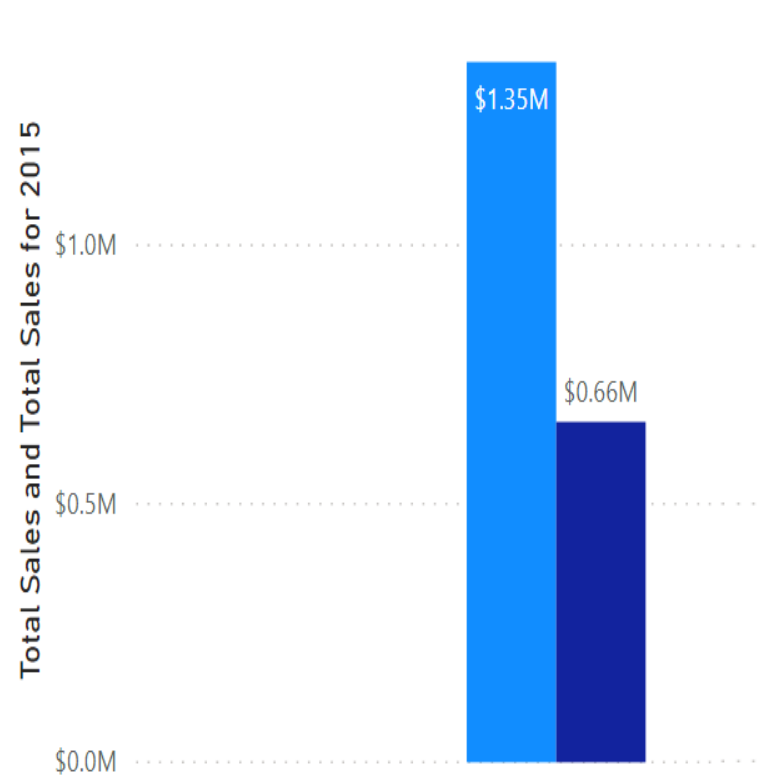
Total Sales by Product ID



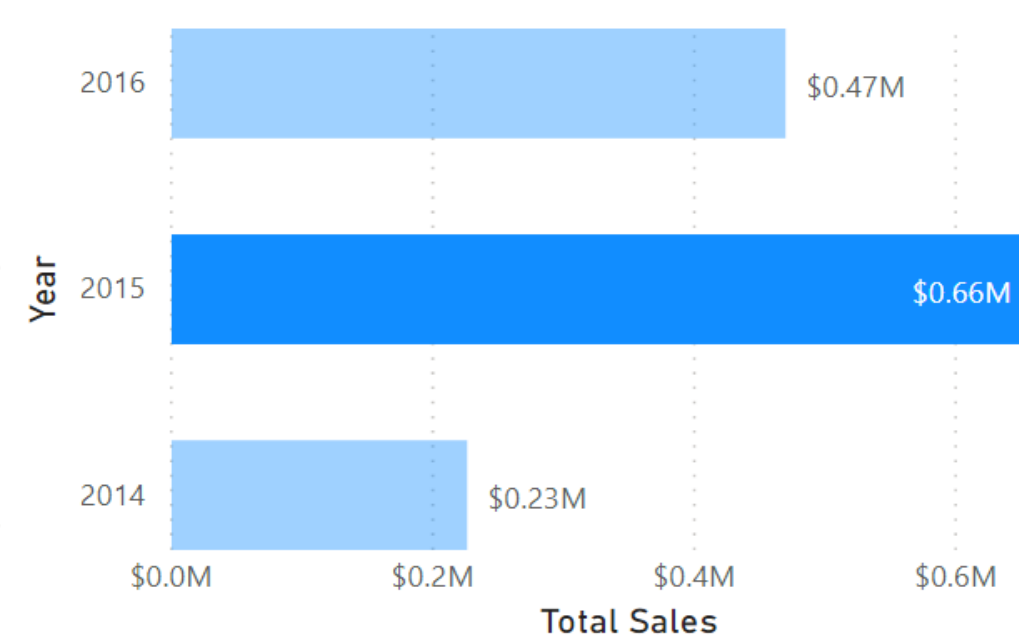
# The CALCULATE() Function

Total Sales and Total Sales for 2015

● Total Sales ● Total Sales for 2015



Total Sales by Year





# 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: Introduction to DAX in Power BI Desktop

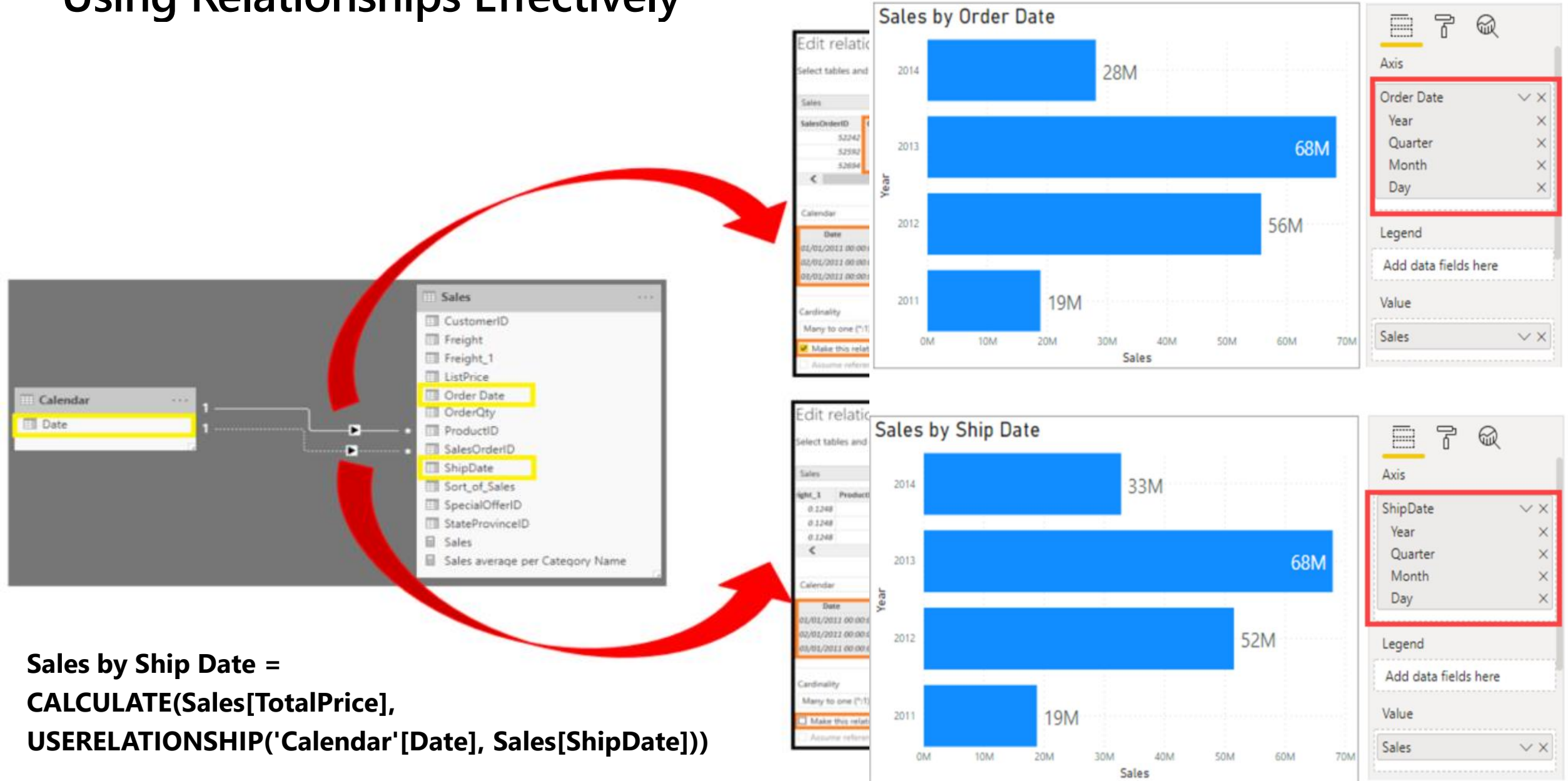


# Lesson 3: Advanced DAX





# Using Relationships Effectively



**Sales by Ship Date =**  
**CALCULATE(Sales[TotalPrice],**  
**USERELATIONSHIP('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
<b>Total</b>	<b>\$226,298.5</b>	<b>\$658,388.75</b>	<b>\$469,771.34</b>

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: Advanced DAX in Power BI Desktop

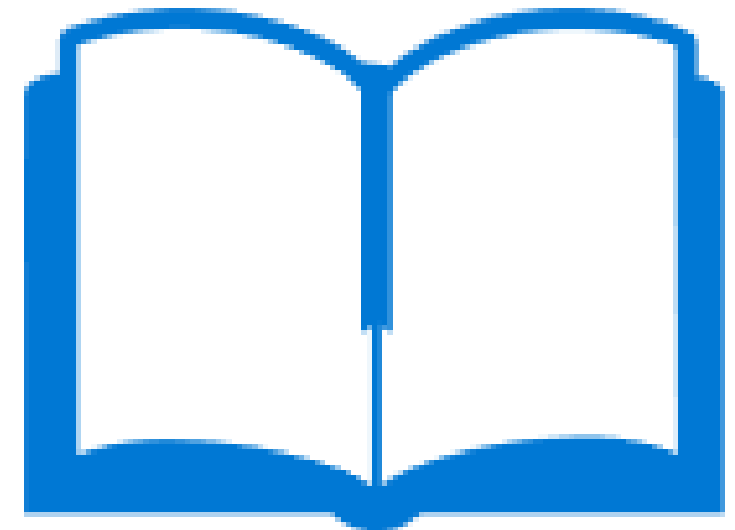
# Module Overview

We covered the following concepts:

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

# References

- DA-100 Introduction to creating measures using DAX in Power BI  
<https://docs.microsoft.com/en-us/learn/modules/create-measures-dax-power-bi/>





# Azure Technical Trainer Role Based Training