Lesson-18

Topic: Visual Calculations
Prerequisites: Download sales_with_geodata.csv file

Puzzle 1: Confusing Totals

- o Visual: Table
- o Columns: Product, Sales, Quantity, Sales / Quantity (as a new column)

- o Problem: The total of Sales / Quantity doesn't match the sum of individual rows.

How to Fix It

Create a measure, not a calculated column:

DAX

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Average Price = DIVIDE(SUM(sales_with_geodata[Sales]), SUM(sales_with_geodata[Quantity]))

This uses filter context, not row context — so at the total level, it does:

sql

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SUM(Sales) / SUM(Quantity)

- o Question: Why is the total different? How would you rewrite the DAX to get the correct total?

Approach	Total Behavior	Use it for
Calculated Column	Sums individual row values	Row-level calcs
Measure	Recalculates at total level	Aggregated metrics like Average Price

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Product	Sum of Sales	Sum of Quantity	Price	Average Price
Camera	324.36	10	32.44	32.44
Camera	304.37	8	38.05	38.05
Camera	325.31	8	40.66	40.66
Camera	327.22	8	40.90	40.90
Camera	364.32	8	45.54	45.54
Camera	343.88	7	49.13	49.13
Camera	501.50	10	50.15	50.15
Camera	501.53	9	55.73	55.73
Camera	406.75	7	58.11	58.11
Camera	641.57	10	64.16	64.16
Camera	642.21	10	64.22	64.22
Camera	365.49	5	73.10	73.10
Camera	366.44	5	73.29	73.29
Camera	464.04	6	77.34	77.34
Camera	471.70	6	78.62	78.62
Total	**636,036.12**	**5399**		**117.81**

Puzzle 2: Filtered vs. Unfiltered Totals

- o Visual: Bar Chart
- o Values: Total Sales (explicit measure), Total Sales (All Categories)
- o Axis: Category
- o Task: Write two measures:
- o One for total sales per category.
- o One ignoring the axis filter (always total sales for all categories).
- o Bonus: Add a % of total column.
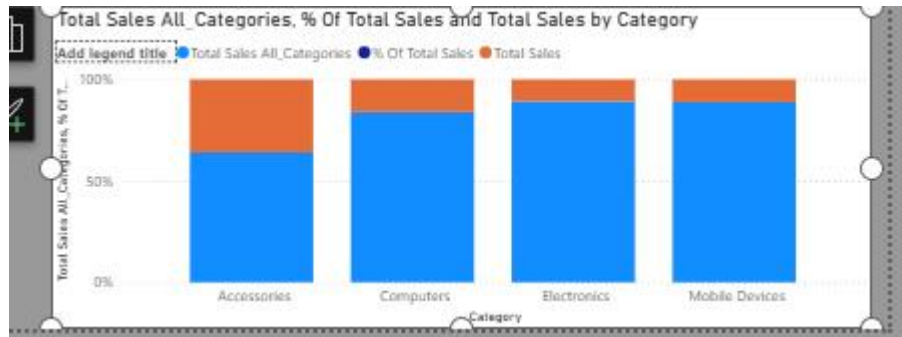
Step-by-Step DAX Measures

✅ 1. Total Sales per Category (standard measure)

This respects filters (like the selected Category in the visual):

DAX
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Total Sales = SUM(Sales[Amount])

✅ 2. Total Sales (All Categories)

Use REMOVEFILTERS or ALL to **ignore** the Category filter:

```
Total Sales All Categories =
CALCULATE(
    [Total Sales],
    REMOVEFILTERS(Sales[Category])  -- or ALL(Sales[Category])
)
```

This will return the same total number for **every bar** in the chart.

✅ 3. % of Total

Now calculate the percentage of each bar from the grand total:

```
% of Total Sales =

DIVIDE(
    [Total Sales],
    [Total Sales All Categories]
)
```

Wrap it in FORMAT(..., "0.0%") if you only want to show it as a percent text.

Puzzle 3: Changing Context with Slicers

- o Visual: Card
- o Measure: Total Sales
- o Task: Add a slicer for Country.
- o Question: Why does the card change when you select different countries?

Follow-Up: Add a second measure to ignore the slicer.

```
Ignore Filter Country = CALCULATE([Total Sales], ALL(sales_with_geodata[Country]))
```

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Puzzle 4: Misleading Average

- o Visual: Table
- o Columns: Region, Average Sales per Order
- o Problem: You calculate Average Sales using:
- o Average Sales = [Total Sales] / [Total Orders]
- o But results are incorrect in visual.

Average Sales =

AVERAGEX(

  VALUES(Sales[OrderID]),

  CALCULATE(SUM(Sales[Amount]))

)

- o Question: Why doesn't this work as expected in a visual?

Puzzle 5: Highlight Top Product per Category

- o Visual: Matrix
- o Rows: Category, Product

```
Values: Total Sales
VAR Source = SUMMARIZE(sales_with_geodata, sales_with_geodata[Product],
```

```
sales_with_geodata[Category], "Total Sales",
CALCULATE(SUM(sales_with_geodata[Sales])))
RETURN ADDCOLUMNS(Source, "rank", COUNTROWS(FILTER(Source, EARLIER([Total Sales]) <
[Total Sales] && [Category] = EARLIER([Category]))) +1)
```

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  - o Task: Add a visual-level filter to show only the top-selling product per category.

    Check Rank = IF([Rank Product In_Category] <= 3 , 1, 0)

Category	Total Sales
⊟ **Accessories**	**252,984.96**
Keyboard	47,410.31
Laptop	108,981.84
Tablet	96,592.81
⊟ **Computers**	**121,993.28**
Monitor	71,295.94
Smartwatch	50,697.34
⊟ **Electronics**	**76,294.07**
Phone	76,294.07
⊟ **Mobile Devices**	**80,610.13**
Total	**531,882.44**

Puzzle 6: Unexpected Blank Values

- o Visual: Table
- o Columns: Customer, Sales in France
- o Measure: `Sales in France = CALCULATE(SUM(Sales[Sales]), Sales[Country] = "France")`
- o Problem: Some customers have blank values even though they made purchases.
- o Question: Why? How to fix it?

Fix — Proper Syntax Using FILTER

Sales in France =

CALCULATE(

  SUM(Sales[Sales]),

  FILTER(

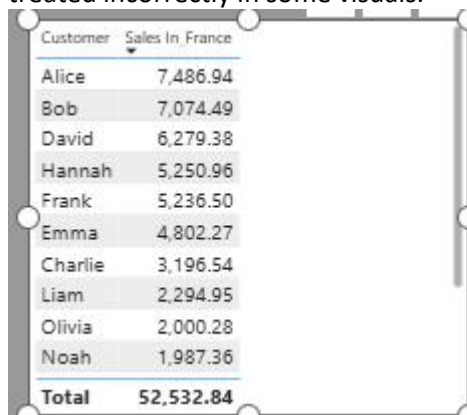   Sales,

    Sales[Country] = "France"

)

)

This tells DAX: "Sum the sales, but only for rows where the country is France."

　Why were some customers blank?

Let's say Customer A only bought in Germany, not France.

Your measure filters only Country = France, so Customer A has no matching rows — result is blank, not zero.

Also: If Sales[Country] = "France" was written without FILTER(), it's ignored or treated incorrectly in some visuals.

Customer	Sales In France
Alice	7,486.94
Bob	7,074.49
David	6,279.38
Hannah	5,250.96
Frank	5,236.50
Emma	4,802.27
Charlie	3,196.54
Liam	2,294.95
Olivia	2,000.28
Noah	1,987.36
Total	52,532.84

Puzzle 7: Time Intelligence Confusion

- o Visual: Line chart
- o Axis: OrderDate (by Month)
- o Values: Sales, Previous Month Sales
- o Task: Add a line for previous month's sales.
- o Challenge: Handle edge cases like first month of year or missing months.

First Month of the Year Issue

? Problem:

In calculations like SAMEPERIODLASTYEAR or PREVIOUSMONTH, the first month of the year (e.g., January) returns blank — because there's no data for the "previous year" or "previous month".

✅ Fix 1: Use IF or ISBLANK to Handle Edge Case

YoY Sales =

VAR prevSales = CALCULATE([Total Sales], SAMEPERIODLASTYEAR('Calendar'[Date]))

RETURN

   IF(ISBLANK(prevSales), 0, [Total Sales] - prevSales)

Or display a message:

YoY Sales Label =

VAR prevSales = CALCULATE([Total Sales], SAMEPERIODLASTYEAR('Calendar'[Date]))

RETURN IF(ISBLANK(prevSales), "No prior data", FORMAT([Total Sales] - prevSales, "#,##0"))

   2. Missing Months (No Sales in Some Months)

? Problem:

If your Sales table has no transactions in, say, March 2024, that month won't show up in your visuals, so trends appear broken.

✅ Fix 2: Use a Proper Date Table and Join It

   Step-by-Step:

Create a Calendar Table using:

Calendar = CALENDAR(DATE(2022,1,1), DATE(2025,12,31))

Add columns like Month, Year, etc.:

Year = YEAR([Date])
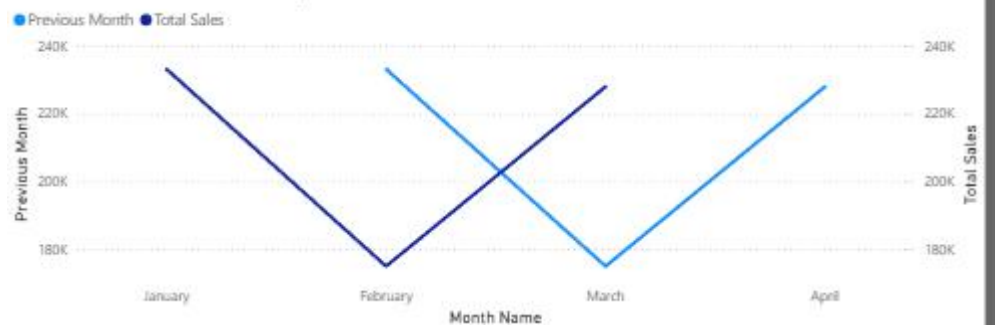
Month = FORMAT([Date], "MMMM")

MonthNum = MONTH([Date])

YearMonth = FORMAT([Date], "YYYY-MM")

Join your Calendar[Date] to Sales[OrderDate].

Use Calendar[Date] in visuals — even if Sales is missing rows.

This ensures all months appear, even those with 0 sales.

Previous Month and Total Sales by Month Name

Puzzle 8: Row-Level Calculation

- o Visual: Table
- o Columns: Product, Quantity, Discount per Unit, Total Discount
- o Measure: `Total Discount = SUMX(Sales, Sales[Quantity] * Sales[Discount per Unit])`
- o Question: Why use SUMX() instead of just multiplying two columns?

```
Total Sales = SUMX(Sales, [Price] * (1- [Discount Product]))
```

Product	Sum of Quantity	Sum of Discount Product
Camera	560	9.80
Headphones	571	10.70
Keyboard	543	9.80
Laptop	489	10.10
Monitor	512	9.50
Mouse	538	9.40
Phone	439	8.60
Printer	680	11.80
Smartwatch	467	9.30
Tablet	600	11.00
Total	**5399**	**100.00**

Puzzle 9: Rank with Ties

- o Visual: Table
- o Columns: City, Total Sales, Rank
- o Challenge: Use RANKX() to handle ties correctly and allow descending/ascending logic

```
Rank with Cities =
    RANKX(ALL(Sales[City]), CALCULATE([Total Sales]), ,DESC,Dense)
```

.

City	Total Sales	Rank with Cities
Mumbai	14,395.43	1
Paris	13,915.85	2
London	13,210.91	3
Berlin	12,874.95	4
Los Angeles	12,726.40	5
Dubai	12,481.47	6
Moscow	10,910.60	7
Cape Town	9,835.72	8
São Paulo	9,781.83	9
Toronto	9,519.27	10
New York	9,234.41	11
Sydney	9,010.18	12
Singapore	9,006.84	13
Total	**163,717.51**	**1**

Puzzle 10: Dynamic Titles and KPIs

- o Visual: Card and Title
- o Task: Show a dynamic card title that changes based on slicer (e.g., selected country).
- o Measure: `Title = "Sales for " & SELECTEDVALUE(Sales[Country], "All Countries")`


```
Title =
VAR country = SELECTEDVALUE(Sales[Country])
RETURN IF( not ISBLANK(country), country, "Select Country")
```