

## Power BI - Advanced DAX - Lecture 20

### CALCULATE

#### CALCULATE()

Evaluates an expression in a context that is modified by filters

USA Revenue = CALCULATE([Revenue], 'Territory Lookup'[Country] = "United State")

=CALCULATE(Expression, [Filter1], [Filter2],...)

Name of an existing measure or a DAX formula for a valid measure

Examples:

- [Total Orders]
- SUM('Returns Data'[Return Quantity])

A Boolean (True/False) expression or a table expression that defines a filter.

Note: these require fixed values or aggregation functions that return a scalar value (you cannot create filters based on measures)

Examples:

- 'Territory Lookup'[Country] = "USA"
- Calendar[Year] <> MAX(Calendar[Year])

#### PRO TIP:

Think of CALCULATE as a filter modifier; it allows you to overrule existing report filters and "force" new filter context

### EXAMPLE: CALCULATE

X ✓ 1 Red Sales = CALCULATE( [Quantity Sold], 'Product Lookup'[Product Color] = "Red" )

- Here we've defined a new measure named Red Sales, which evaluates the Quantity Sold measure under a filter context where the product color is "Red"

"Total Orders"

Product Color	Quantity Sold	Red Sales
Black	10,590	4,011
Multi	5,756	4,011
Red	4,011	4,011
Silver	3,257	4,011
<b>Total</b>	<b>23,614</b>	<b>4,011</b>

Note how we see the same repeated values for each product color, and even the total!

## HEY THIS IS IMPORTANT!

- The **CALCULATE** function modifies and overrules any competing filter context!
- In this matrix, the "Black" row has competing filter context: Product Color = Black (from the row label) and Product Color= "Red" (from the **CALCULATE** function)
- Both can't be true at the same time, so the "Red" filter from **CALCULATE** takes priority

### STEP 1

Filter context is detected & applied

Product Color	Quantity Sold	Red Sales
Black	10,590	4,011
Red	4,011	4,011
Silver	3,257	4,011

'Product Lookup'[Product Color] = "Black"

Product Table
Black

### CALCULATE

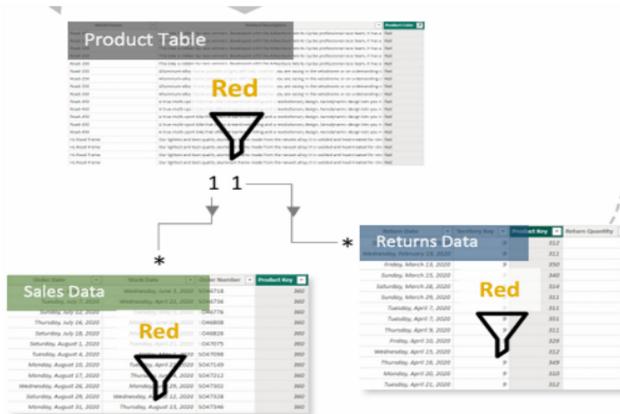
Filters are modified by **CALCULATE**  
[Product Color] = "Red"

Product Table
Red

If the measure being evaluated contains a **CALCULATE** function, filter context is overwritten between Step 1 & Step 2

### STEP 2

Filters flow "downstream" to related tables



### STEP 3

Measure evaluates against the filtered table

1 Quantity Sold =  
2 SUM( 'Sales Data'[Order Quantity] )

- Sum of the Order Quantity column in the Sales Data table, filtered to rows where the product color is "Red"

$$= 4,011$$

## Calculate Bulk Orders & Weekend Orders.

1. Calculate
2. Measure

```
Is Weekend? = IF('Calendar Lookup'[Week Of Day] IN {6,7}, "Weekend" , "Weekday")
```

24K

Weekend Order

```
Weekend Order = CALCULATE([Total Orders], 'Calendar Lookup'[Is Weekend?] = "Weekend")
```

```
1 Bulk Orders =
2   | CALCULATE(
3   |   | [Total Orders],
4   |   | 'Sales Data'[OrderQuantity] > 1
5   )
```

53K

Bulk Orders

Filter

```
Weekend Orders =
| CALCULATE(
|   | [Total Orders],
|   | 'Calendar Lookup'[Weekend] = "Weekend")
```

Is Weekend?

## DAX MEASURE TOTALS

Measure totals may seem incorrect or inconsistent depending on how they are calculated, because they don't simply add up the visible values in the report

```
1 Total Orders =
2 DISTINCTCOUNT(
3   | 'Sales Data'[Order Number]
4 )
```

[Total Orders] counts distinct orders  
in the Sales Data table

```
Quantity Sold = SUM('Sales Data'[OrderQuantity])
```



Total Returns look right, but  
shouldn't Total Orders be 37,888??

Category Name	Total Returns	Total Orders
Accessories	1,115	16,983
Bikes	427	13,929
Clothing	267	6,976
<b>Total</b>	<b>1,809</b>	<b>25,164</b>

Order Date	Stock Date	Order Number	Product Key
Thursday, June 30, 2022	Thursday, April 07, 2022	S074140	568
Thursday, June 30, 2022	Friday, March 04, 2022	S074140	477
Thursday, June 30, 2022	Monday, May 30, 2022	S074140	223
Thursday, June 30, 2022	Friday, April 29, 2022	S074141	604
Thursday, June 30, 2022	Wednesday, May 04, 2022	S074141	471
Thursday, June 30, 2022	Monday, May 30, 2022	S074142	383
Thursday, June 30, 2022	Friday, March 18, 2022	S074142	490
Thursday, June 30, 2022	Tuesday, March 15, 2022	S074143	479
Thursday, June 30, 2022	Friday, April 08, 2022	S074143	606
Thursday, June 30, 2022	Tuesday, March 22, 2022	S074143	477
Thursday, June 30, 2022	Thursday, June 02, 2022	S074143	462
Thursday, June 30, 2022	Monday, April 25, 2022	S074144	574
Thursday, June 30, 2022	Sunday, April 24, 2022	S074144	220
Thursday, June 30, 2022	Monday, March 14, 2022	S074145	561
Thursday, June 30, 2022	Tuesday, June 14, 2022	S074146	584
Thursday, June 30, 2022	Friday, March 18, 2022	S074147	605
Thursday, June 30, 2022	Sunday, May 29, 2022	S074147	538
Thursday, June 30, 2022	Thursday, March 24, 2022	S074147	490

Table: Sales Data (56,046 rows) Column: Order Number (25,164 distinct values)

Order S074144 included two products: a bike and a helmet. That counts as 1 distinct order for the Total and 1 distinct order for BOTH Accessories & Bikes

With no filter context, there are 25,164 total distinct orders

**PRO TIP:**  
Understand EXACTLY how your measures calculate and what they are designed to measure

## ASSIGNMENT: CALCULATE

1. Create a new measure named Bike Returns to calculate the total quantity of bikes returned.
2. Create a matrix to show Bike Returns (values) by Start of Month (rows). What do you notice about the volume of bike returns over time?
3. Create a new measure named Bike Sales to calculate the total quantity of bikes sold, and add it to the matrix. What do you notice?
4. Create a new measure named Bike Return Rate using either CALCULATE or DIVIDE, and add it to the matrix
5. How would you respond to the Product VP's concerns about rising bike returns?

Hint 1: Calculate, Total Returns - Existing Measure, Apply Filter on Bikes.

Hint 2: Drop all parameters in Matrix Visual To observe some pattern.

Hint 3: Quantity Sold, Filter on Bikes.

Hint 4: Calculate, Return Rate as Existing Measure, Filter on Bikes.

Hint 5: Just drop Bike return, Bike Sales, Bike Return Rate and analyze the result.