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DAX  
Explanation

# CALCULATE Part 5

## Useful Patterns



Patou Tips #47

# CALCULATE Useful Patterns



In this new chapter on the DAX "Calculate" function, we will look at some very useful patterns, applying the rules relating to filter and row contexts, and context transition, which we have previously discussed.

- ✓ Cumulated total (in Time Series)
- ✓ Cumulated total (with Product dimension)
- ✓ Average (in Time Series)
- ✓ Average (with Product dimension)
- ✓ Patterns with Time Intelligence
- ✓ Patterns for Min, Max, First, Last values

# CALCULATE

## Cumulated total (in Time Series)



### Cumulated Sales

This pattern is interesting to build a cumulated total

```
Cumulated Sales =  
CALCULATE(  
    [Sales],  
    | 'Dim Date'[Date] <= MAX('Dim Date'[Date])  
)
```

In this pattern, the filter is a loop to create a row context. This loop compares the date of the row with the maximum of the date of the selection (the table) for each row. This row context triggers the context transition, so for each row the condition is true, so it performs the cumulative sales for each row.

Year	Month	Sales	Cumulated Sales
2021		31 169 191	31 169 191
2022	janv	3 426 560	34 595 751
	févr	2 677 182	37 272 933
	mars	2 780 417	40 053 350
	avr	2 826 626	42 879 976
	mai	3 091 387	45 971 363
	juin	3 339 128	49 310 491
	juil	4 248 771	53 559 262
	août	5 432 050	58 991 312
	sept	4 525 100	63 516 412
	oct	3 963 715	67 480 127
	nov	3 660 262	71 140 389
	déc	4 398 802	75 539 191
	Total	44 370 000	75 539 191
2023	janv	4 675 256	80 214 447
	févr	3 644 896	83 859 343
	mars	3 803 543	87 662 886
	avr	3 867 562	91 530 448
	mai	4 195 813	95 726 261
	juin	4 430 584	100 156 845
	juil	5 493 073	105 649 918
	août	6 786 656	112 436 574
	sept	5 337 762	117 774 336
	oct	4 387 263	122 161 599

# CALCULATE

## Cumulated total (in Time Series)

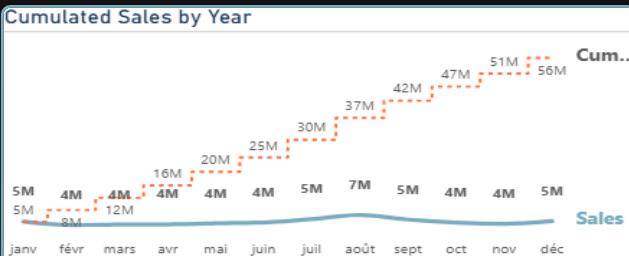


### Cumulated Sales by Year

A variation of the previous model, but we have clarified the scope of the calculation (year).

```
Cumulated Sales by Year =  
VAR SelectedYear = SELECTEDVALUE('Dim Date'[Year])  
  
RETURN  
CALCULATE(  
    [Sales],  
    'Dim Date'[Date] <= MAX('Dim Date'[Date]),  
    'Dim Date'[Year] = SelectedYear  
)
```

Each year the cumulative sales start again.



Year	Month	Sales	Cumulated Sales by Year
2021		31 169 191	31 169 191
2022	janv	3 426 560	3 426 560
	févr	2 677 182	6 103 742
	mars	2 780 417	8 884 159
	avr	2 826 626	11 710 785
	mai	3 091 387	14 802 172
	juin	3 339 128	18 141 300
	juil	4 248 771	22 390 071
	août	5 432 050	27 822 121
	sept	4 525 100	32 347 221
	oct	3 963 715	36 310 936
	nov	3 660 262	39 971 198
	déc	4 398 802	44 370 000
	Total	44 370 000	44 370 000
2023	janv	4 675 256	4 675 256
	févr	3 644 896	8 320 152
	mars	3 803 543	12 123 695
	avr	3 867 562	15 991 257
	mai	4 195 813	20 187 070
	juin	4 430 584	24 617 654
	juil	5 493 073	30 110 727
	août	6 786 656	36 897 383
	sept	5 337 762	42 235 145
	oct	4 387 263	46 622 408

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# CALCULATE

## Cumulated total (in Time Series)



### Cumulated Sales variations

→ Many variations can be made, by quarter, by semester...

Year	Semeste	Quarter	Month	Sales	Cumulated Sales by Year	Cumulated Sales by Quarter	Cumulated Sales by Semester
2023	S1	Q1	janv	4 675 256	4 675 256	4 675 256	4 675 256
			févr	3 644 896	8 320 152	8 320 152	8 320 152
			mars	3 803 543	12 123 695	12 123 695	12 123 695
			Total	12 123 695	12 123 695	12 123 695	12 123 695
	S2	Q2	avr	3 867 562	15 991 257	3 867 562	15 991 257
			mai	4 195 813	20 187 070	8 063 375	20 187 070
			juin	4 430 584	24 617 654	12 493 959	24 617 654
			Total	12 493 959	24 617 654	12 493 959	24 617 654
			Total	24 617 654	24 617 654	24 617 654	24 617 654
	S3	Q3	juil	5 493 073	30 110 727	5 493 073	5 493 073
			août	6 786 656	36 897 383	12 279 729	12 279 729
			sept	5 337 762	42 235 145	17 617 491	17 617 491
			Total	17 617 491	42 235 145	17 617 491	17 617 491
	S4	Q4	oct	4 387 263	46 622 408	4 387 263	22 004 754
			nov	4 052 595	50 675 003	8 439 858	26 057 349
			déc	4 889 337	55 564 340	13 329 195	30 946 686
			Total	13 329 195	55 564 340	13 329 195	30 946 686
			Total	30 946 686	55 564 340	30 946 686	30 946 686
			Total	55 564 340	55 564 340	55 564 340	55 564 340
			Total	55 564 340	55 564 340	55 564 340	55 564 340

#### By year



#### By semester



#### By quarter



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# CALCULATE

## Cumulated total (in Time Series)



### Cumulated Sales variations



```
Cumulated Sales by Semester =  
VAR Selected_Year = SELECTEDVALUE('Dim Date'[Year])  
VAR Selection_Semester = SELECTEDVALUE('Dim Date'[Semester])  
  
RETURN  
CALCULATE(  
    [Sales],  
    FILTER(  
        ALL('Dim Date'),  
        'Dim Date'[Date]<=MAX('Dim Date'[Date]) &&  
        'Dim Date'[Semester]= Selection_Semester &&  
        'Dim Date'[Year]= Selected_Year  
    )
```



```
Cumulated Sales by Quarter =  
VAR Selected_Year = SELECTEDVALUE('Dim Date'[Year])  
VAR Selection_Quarter = SELECTEDVALUE('Dim Date'[Quarter])  
  
RETURN  
CALCULATE(  
    [Sales],  
    FILTER(  
        ALL('Dim Date'),  
        'Dim Date'[Date]<=MAX('Dim Date'[Date]) &&  
        'Dim Date'[Quarter]= Selection_Quarter &&  
        'Dim Date'[Year]= Selected_Year  
    )
```

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# CALCULATE

Cumulated total (with Product dimension)



## Cumulated Sales by Product

Here dimension is not a period but a product. It could be made with the dimensions Customer, Supplier, Income Statement, etc.

```
Cumulated Sales by Product =  
CALCULATE(  
    [Sales],  
    FILTER(  
        ALL('Dim Product'),  
        'Dim Product'[Index]<=MAX('Dim Product'[Index])  
    ))
```

Category	Subcategory	Sales	Cumulated Sales by Product
IceCream	Chocolate	11 114 679	11 114 679
	Lemon	7 779 682	18 894 361
	Mint	6 668 126	25 562 487
	Strawberry	8 891 368	34 453 855
	Vanilla	10 003 057	44 456 912
	Total	44 456 912	44 456 912
Macaron	Caramel	1 109 858	45 566 770
	Chocolate	3 333 141	48 899 911
	Lemon	1 665 662	50 565 573
	Pistachio	2 777 286	53 342 859
	Strawberry	2 221 481	55 564 340
	Total	11 107 428	55 564 340
Total		55 564 340	55 564 340

## Cumulated Sales by Category

```
Cumulated Sales by Category =  
VAR Selection_Category = SELECTEDVALUE('Dim Product'[Category])  
  
RETURN  
CALCULATE(  
    [Sales],  
    FILTER(  
        ALL('Dim Product'),  
        'Dim Product'[Index]<=MAX('Dim Product'[Index]) &&  
        'Dim Product'[Category]=Selection_Category  
    ))
```

Category	Subcategory	Sales	Cumulated Sales by Category
IceCream	Chocolate	11 114 679	11 114 679
	Lemon	7 779 682	18 894 361
	Mint	6 668 126	25 562 487
	Strawberry	8 891 368	34 453 855
	Vanilla	10 003 057	44 456 912
	Total	44 456 912	44 456 912
Macaron	Caramel	1 109 858	1 109 858
	Chocolate	3 333 141	4 442 999
	Lemon	1 665 662	6 108 661
	Pistachio	2 777 286	8 885 947
	Strawberry	2 221 481	11 107 428
	Total	11 107 428	11 107 428
Total		55 564 340	55 564 340

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# CALCULATE

## Average (in Time Series)



### Average Sales by Year

A variation of the previous model, but we have clarified the scope of the calculation (year).

```
Average Sales by Year =  
VAR Selection_Year = SELECTEDVALUE('Dim Date'[Year])  
VAR Selection_Semester = SELECTEDVALUE('Dim Date'[Semester])  
  
VAR Result =  
CALCULATE(  
    AVERAGEX(  
        VALUES('Dim Date'[Month]),[Sales]),  
        FILTER(  
            ALL('Dim Date'),  
            'Dim Date'[Year] = Selection_Year)  
)  
  
RETURN Result
```

Year	Semester	Quarter	Month	Sales	Average Sales by Year	
2023	S1	Q1	janv	4 675 216	4 630 362	
			févr	3 644 836	4 630 362	
			mars	3 803 543	4 630 362	
			Total	12 123 695	4 630 362	
	Q2		avr	3 867 512	4 630 362	
			mai	4 195 813	4 630 362	
			juin	4 430 584	4 630 362	
			Total	12 493 959	4 630 362	
				Total	24 617 654	4 630 362
	S2	Q3	juil	5 493 073	4 630 362	
			août	6 786 636	4 630 362	
			sept	5 337 702	4 630 362	
			Total	17 617 491	4 630 362	
	Q4		oct	4 387 263	4 630 362	
			nov	4 052 595	4 630 362	
			déc	4 889 317	4 630 362	
			Total	13 329 195	4 630 362	
				Total	30 946 686	4 630 362
				Total	55 564 340	4 630 362
				Total	55 564 340	4 630 362

AVERAGEX creates favorable conditions for iteration in association with VALUES. Each year, the average sales are recalculated using the FILTER pattern.



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# CALCULATE

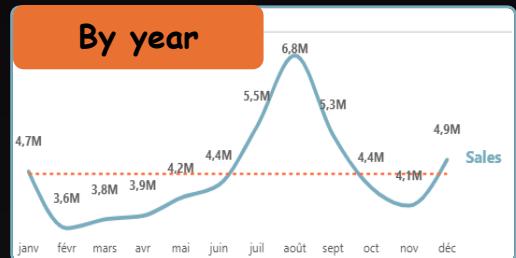
## Average (in Time Series)



### Average Sales variations

→ This model is really interesting because many variations can be made, by quarter, by semester...

Year	Semester	Quarter	Month	Sales	Average Sales by Year	Average Sales by Semester	Average Sales by Quarter
2023	S1	Q1	janv	4 675 256	4 630 362	4 102 942	4 041 232
			févr	3 644 896	4 630 362	4 102 942	4 041 232
			mars	3 803 543	4 630 362	4 102 942	4 041 232
			Total	12 123 695	4 630 362	4 102 942	4 041 232
		Q2	avr	3 867 562	4 630 362	4 102 942	4 164 653
			mai	4 195 813	4 630 362	4 102 942	4 164 653
			juin	4 430 584	4 630 362	4 102 942	4 164 653
			Total	12 493 959	4 630 362	4 102 942	4 164 653
			Total	24 617 654	4 630 362	4 102 942	
	S2	Q3	juil	5 493 073	4 630 362	5 157 781	5 872 497
			août	6 786 656	4 630 362	5 157 781	5 872 497
			sept	5 337 762	4 630 362	5 157 781	5 872 497
			Total	17 617 491	4 630 362	5 157 781	5 872 497
		Q4	oct	4 387 263	4 630 362	5 157 781	4 443 065
			nov	4 052 595	4 630 362	5 157 781	4 443 065
			déc	4 889 337	4 630 362	5 157 781	4 443 065
			Total	13 329 195	4 630 362	5 157 781	4 443 065
			Total	30 946 686	4 630 362	5 157 781	
			Total	55 564 340	4 630 362		
			Total	55 564 340	4 630 362		



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# CALCULATE

## Average (in Time Series)



### Average Sales variations



```
Average Sales by Semester =  
VAR Selection_Year = SELECTEDVALUE('Dim Date'[Year])  
VAR Selection_Semester = SELECTEDVALUE('Dim Date'[Semester])  
  
VAR Result =  
CALCULATE(  
    AVERAGEX(  
        VALUES('Dim Date'[Month]), [Sales]),  
        FILTER(  
            ALL('Dim Date'),  
            'Dim Date'[Semester] = Selection_Semester &&  
            'Dim Date'[Year] = Selection_Year  
        )  
)  
  
RETURN Result
```



```
Average Sales by Quarter =  
VAR Selection_Year = SELECTEDVALUE('Dim Date'[Year])  
VAR Selection_Quarter = SELECTEDVALUE('Dim Date'[Quarter])  
  
VAR Result =  
CALCULATE(  
    AVERAGEX(  
        VALUES('Dim Date'[Month]), [Sales]),  
        FILTER(  
            ALL('Dim Date'),  
            'Dim Date'[Quarter] = Selection_Quarter &&  
            'Dim Date'[Year] = Selection_Year  
        )  
)  
  
RETURN Result
```

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# CALCULATE

## Time Intelligence



### Sales Last Year (LY)

Thanks to the time calculation function, it's the perfect winning combination.

A function such "DATEADD"  
allow you a lot patterns

```
Sales LY =  
    CALCULATE([Sales],  
        DATEADD('Dim Date'[Date], -1, YEAR))
```

Year	Month	Sales	Sales LY
2021		31 169 191	
2022	janv	3 426 560	2 370 663
	févr	2 677 182	1 843 340
	mars	2 780 417	1 904 775
	avr	2 826 626	1 935 235
	mai	3 091 387	2 118 842
	juin	3 339 128	2 293 254
	juil	4 248 771	2 920 484
	août	5 432 050	3 801 135
	sept	4 525 100	3 229 031
	oct	3 963 715	2 852 219
	nov	3 660 262	2 674 993
	déc	4 398 802	3 225 220
	Total	44 370 000	31 169 191
2023	janv	4 675 256	3 426 560
	févr	3 644 896	2 677 182
	mars	3 803 543	2 780 417
	avr	3 867 562	2 826 626
	mai	4 195 813	3 091 387
	juin	4 430 584	3 339 128
	juil	5 493 073	4 248 771
	août	6 786 656	5 432 050
	sept	5 337 762	4 525 100
	oct	4 387 263	3 963 715
	nov	4 052 595	3 660 262

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# CALCULATE

## Time Intelligence



### Sales Last Period

Year	Month	Sales	Sales LM	Sales LQ	Sales LS	Sales LY
2023	janv	4 675 256	4 398 802	3 963 715	4 248 771	3 426 560
	févr	3 644 896	4 675 256	3 660 262	5 432 050	2 677 182
	mars	3 803 543	3 644 896	4 398 802	4 525 100	2 780 417
	avr	3 867 562	3 803 543	4 675 256	3 963 715	2 826 626
	mai	4 195 813	3 867 562	3 644 896	3 660 262	3 091 387
	juin	4 430 584	4 195 813	3 803 543	4 398 802	3 339 128
	juil	5 493 073	4 430 584	3 867 562	4 675 256	4 248 771
	août	6 786 656	5 493 073	4 195 813	3 644 896	5 432 050
	sept	5 337 762	6 786 656	4 430 584	3 803 543	4 525 100
	oct	4 387 263	5 337 762	5 493 073	3 867 562	3 963 715
	nov	4 052 595	4 387 263	6 786 656	4 195 813	3 660 262
	déc	4 889 337	4 052 595	5 337 762	4 430 584	4 398 802
	Total	<b>55 564 340</b>	<b>55 073 805</b>	<b>54 257 924</b>	<b>50 846 354</b>	<b>44 370 000</b>
<b>Total</b>		<b>55 564 340</b>	<b>55 073 805</b>	<b>54 257 924</b>	<b>50 846 354</b>	<b>44 370 000</b>

Many variations can be made, by week, by month, by quarter, by semester...

For each selected period, the previous value for that period is displayed.

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#### Notes

LM = Last Month  
 LQ = Last Quarter  
 LS = Last Semester  
 LY = Last Year

**Sales LM =**  
`CALCULATE([Sales],  
DATEADD('Dim Date'[Date],-1,MONTH))`

**Sales LQ =**  
`CALCULATE([Sales],  
DATEADD('Dim Date'[Date],-1,QUARTER))`

**Sales LS =**  
`CALCULATE([Sales],  
DATEADD('Dim Date'[Date],-6,MONTH))`

# CALCULATE

Min, Max, First, Last values



## Min, Max, First, Last Sales

Often, certain specific values are needed for later uses, for formulas, but also, as in the examples to come, to improve a visualization.

Year	Month	Sales	Min Value	Max Value	Max Value	First Value	Last Value	First, Last, Min, Max
2023	janv	4 675 256			6 786 656	4 675 256		4 675 256
	févr	3 644 896	3 644 896		6 786 656			3 644 896
	mars	3 803 543			6 786 656			
	avr	3 867 562			6 786 656			
	mai	4 195 813			6 786 656			
	juin	4 430 584			6 786 656			
	juil	5 493 073			6 786 656			
	août	6 786 656		6 786 656	6 786 656			6 786 656
	sept	5 337 762			6 786 656			
	oct	4 387 263			6 786 656			
	nov	4 052 595			6 786 656			
	déc	4 889 337			6 786 656		4 889 337	4 889 337
	Total	55 564 340			6 786 656	4 675 256	4 889 337	
	Total	55 564 340			6 786 656	4 675 256	4 889 337	

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# CALCULATE

## Min, Max, First, Last values



### Min, Max

```
Min Value =  
VAR Current_Year = SELECTEDVALUE('Dim Date'[Year])  
  
VAR Min_Value =  
CALCULATE(  
    MINX(  
        VALUES('Dim Date'[Month]),[Sales]),  
        FILTER(  
            ALL('Dim Date'),  
            'Dim Date'[Year] = Current_Year)  
)  
  
VAR Value_To_Show =  
SWITCH(  
    TRUE(),  
    [Sales]=Min_Value, [Sales], BLANK())  
  
RETURN Value_To_Show
```

1

```
Max Value =  
VAR Current_Year = SELECTEDVALUE('Dim Date'[Year])  
  
VAR Max_Value =  
CALCULATE(  
    MAXX(  
        VALUES('Dim Date'[Month]),[Sales]),  
        FILTER(  
            ALL('Dim Date'),  
            'Dim Date'[Year] = Current_Year)  
)  
  
VAR Value_To_Show =  
SWITCH(  
    TRUE(),  
    [Sales]=Max_Value, [Sales], BLANK())  
  
RETURN Value_To_Show
```

2

```
Max Value ALL =  
VAR Current_Year = SELECTEDVALUE('Dim Date'[Year])  
  
VAR Max_Value =  
CALCULATE(  
    MAXX(  
        VALUES('Dim Date'[Month]),[Sales]),  
        FILTER(  
            ALL('Dim Date'),  
            'Dim Date'[Year] = Current_Year)  
)  
  
RETURN Max_Value
```

3

1 The MINX and MAXX functions create favorable conditions for iteration in within VALUES. Then, only the desired value (Min or Max) is displayed.

2 With ALL, it might be useful to populate the Min or Max value across the entire time series (see next page).

3 With ALL, it might be useful to populate the Min or Max value across the entire time series (see next page).

# CALCULATE

## Min, Max, First, Last values



### Min, Max

Year	Month	Sales	Max Value	Max & coef
2023	janv	4 675 256	10 179 984	
	févr	3 644 896	10 179 984	
	mars	3 803 543	10 179 984	
	avr	3 867 562	10 179 984	
	mai	4 195 813	10 179 984	
	juin	4 430 584	10 179 984	
	juil	5 493 073	10 179 984	
	août	6 786 656	10 179 984	
	sept	5 337 762	10 179 984	
	oct	4 387 263	10 179 984	
	nov	4 052 595	10 179 984	
	déc	4 889 337	10 179 984	
Total		55 564 340	10 179 984	
Total		55 564 340	10 179 984	

```
Max & coef =
VAR Current_Year = SELECTEDVALUE('Dim Date'[Year])

VAR Max_Value =
CALCULATE(
    MAXX(
        VALUES('Dim Date'[Month]),[Sales]),
    FILTER(
        ALL('Dim Date'),
        'Dim Date'[Year] = Current_Year)
)
RETURN Max_Value * 1.5
```



Using a coefficient, the ALL calculation allows you to place a line (or an area) above your graph with the Max value or below it with the Min value. This is a useful trick to improve your visualization.

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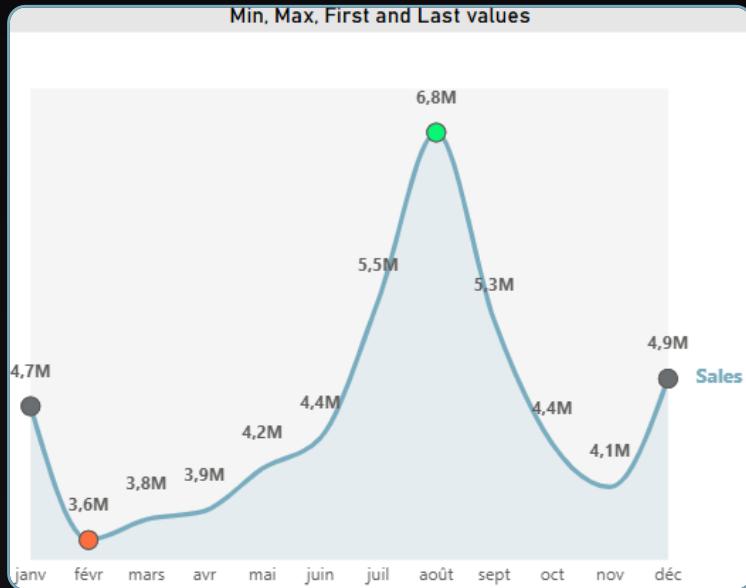
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# CALCULATE

## Min, Max, First, Last values



### Min, Max, First, last



```
First Value =  
VAR Current_Year = SELECTEDVALUE('Dim Date'[Year])  
VAR First_Date_With_Sales =  
CALCULATE(  
    MONTH(MIN('Fact_Sales IceCream & Macaron'[Date])),  
    FILTER(  
        ALL('Dim Date'),  
        'Dim Date'[Year] = Current_Year  
    )  
)  
  
VAR First_Value =  
CALCULATE(  
    [Sales],  
    FILTER('Dim Date',  
        'Dim Date'[NumMonth] = First_Date_With_Sales &&  
        'Dim Date'[Year] = Current_Year  
    )  
)  
  
RETURN First_Value
```

```
Last Value =  
VAR Current_Year = SELECTEDVALUE('Dim Date'[Year])  
VAR Last_Date_With_Sales =  
CALCULATE(  
    MONTH(MAX('Fact_Sales IceCream & Macaron'[Date])),  
    FILTER(  
        ALL('Dim Date'),  
        'Dim Date'[Year] = Current_Year  
    )  
)  
  
VAR Last_Value =  
CALCULATE(  
    [Sales],  
    FILTER('Dim Date',  
        'Dim Date'[NumMonth] = Last_Date_With_Sales &&  
        'Dim Date'[Year] = Current_Year  
    )  
)  
  
RETURN Last_Value
```

It might be interesting to also add the first or last value of a time series.

# Learn and practice

Find past issues of "Patou Tips" and download resources to practice on GitHub



Easy to do it...

Patou Tips #5



Create a **Customized Chart** (for income statement)



To practice downloadable free resources in GitHub



**Patou Tips #5**  
Create a  
Customized  
Chart  
(for income  
statement)

Easy to do it...

Patou Tips #6



Create  
**Customized Icon**



(with PowerPoint for PowerBI)



**Patou Tips #6**  
Create  
Customized Icon

Easy to do it...

Patou Tips #7



Create an **Age Pyramid Chart** (for Human Ressources)



To practice downloadable free resources in GitHub



**Patou Tips #7**  
Create an Age  
Pyramid Chart  
(for Human  
Ressources)

Easy to do it...

Patou Tips #12



Calculate the correct evolution for KPI



**Patou Tips #12**  
Calculate right  
evolution for  
KPI

Patou Tips #23

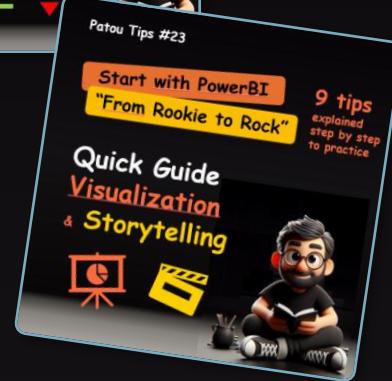


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9 tips explained step by step to practice

Quick Guide Visualization & Storytelling



**Patou Tips #23**  
Quick Guide Visualization &  
Storytelling



**Resources on GitHub**  
<https://github.com/Patou-Tips/Patou-Tips>

Don't forget!

This isn't the truth, it's just my truth!

## Patou Tips



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