Power BI - Advanced DAX + Dashboard Making

ASSIGNMENT: CALCULATE & ALL

1.Create a new measure named All Returns to calculate the total number of returns, regardless of filter context

2. Create a new measure named % of All Returns that divides Total Returns by All Returns

3.Create a matrix to show % of All Returns (values) by product Category Name (rows). Which category accounts for the largest percentage of returns? The smallest?

```
All Returns =
    CALCULATE(
        [Total Returns],
        ALL(
            'Returns Data'))
```

```
% of All Returns =
    DIVIDE(
        [Total Returns],
        [All Returns])
```

CategoryName	Total Returns	All Returns	% of All Returns
		1,809	
Accessories	1,115	1,809	61.64%
Bikes	427	1,809	23.60%
Clothing	267	1,809	14.76%
Components		1,809	
Total	**1,809**	**1,809**	**100.00%**

```
Total Returns = SUM('Returns Data'[ReturnQuantity])
```

```
All Returns = CALCULATE([Total Returns], ALL('Returns Data'))
```

CategoryName	Total Returns	All Returns
Accessories	1130	1828
Bikes	429	1828
Clothing	269	1828
Components		1828
Total	**1828**	**1828**

FILTER

FILTER() :-
Returns a table that represents a subset of another table or expression

=FILTER(Table, FilterExpression)

Table to be filtered
Examples:
- Territory Lookup
- Customer Lookup

A Boolean (True/False) filter expression to be evaluated for each row of the table
Examples:
- 'Territory Lookup'[Country] = "USA"
- Calendar[Year] = 1998
- Products[Price] > [Overall Avg Price]

HEY THIS IS IMPORTANT!

- FILTER is used to add new filter context, and can handle more complex filter expressions than CALCULATE (by referencing measures, for example)

- Since FILTER returns an entire table, it's often nested within other functions, like CALCULATE or SUMX

PRO TIP:
- Since FILTER iterates through each row in a table, it can be slow and computationally expensive; only use FILTER if a simple CALCULATE function won't get the job done!

```
High Ticket Orders =
    CALCULATE(
        [Total Orders],
        'Product Lookup'[ProductPrice] > 714.44 ))
```

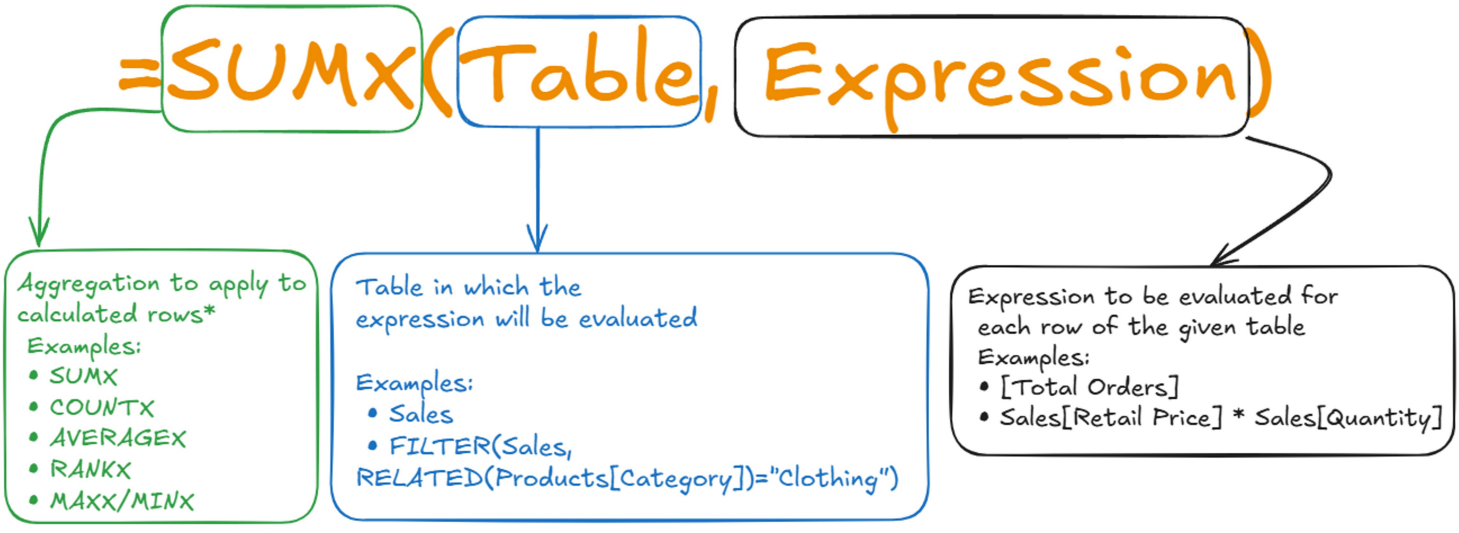
Instead of calling the hard coded value, we must use some filter function to calculate the values row basis.

```
High Ticket Orders =
    CALCULATE(
        [Total Orders],
        FILTER(
            'Product Lookup',
            'Product Lookup'[ProductPrice] > [Overall Average Price]))
```

CategoryName	Weekend Orders	Total Orders	All Orders	% of All Orders	Average Retail Price	Overall Average Price	High Ticket Orders
		1	25,165	0.00%		$714.44	
Accessories	4,913	16,983	25,165	67.49%	$34.26	$714.44	
Bikes	3,995	13,929	25,165	55.35%	$1,541.38	$714.44	11312
Clothing	1,962	6,976	25,165	27.72%	$50.68	$714.44	
Components			25,165		$432.19	$714.44	
Total	**7,214**	**25,165**	**25,165**	**100.00%**	**$714.44**	**$714.44**	**11312**

ITERATOR FUNCTIONS

Iterator (or "X") functions allow you to loop through the same expression on each row of a table, then apply some sort of aggregation to the results (SUM, MAX, etc.)



PRO TIP:
- Imagine that iterator functions add a temporary new column to a table, calculate a value in each row based on the given expression, then aggregate the values within that temporary column (similar to SUMPRODUCT in Excel).

Product Price	Quantity	Overall Price
100	10	1,000
200	5	1,000
400	5	2,000
500	2	1,000
1000	1	1,000

= 6,000

Total Cost = (100 * 10) + (200* 5) + (400 * 5) + (500*2) + (1000 * 1) = 6,000

```
Total Revenue =
    SUMX(
        'Sales Data',
        'Sales Data'[OrderQuantity] *
        RELATED(
            'Product Lookup'[ProductPrice]))
```

ASSIGNMENT: ITERATORS

1. Create a new measure named Total Cost that multiplies the order quantities in the Sales Data table by the product cost in the Product Lookup table, then calculates the sum

```
Total Cost =
    SUMX(
        'Sales Data',
        'Sales Data'[OrderQuantity] *
        RELATED(
            'Product Lookup'[ProductCost]))
```

2. Create a new measure named Total Profit (revenue minus cost)

```
Total Profit =
    [Total Revenue] - [Total Cost]
```

3. Create a matrix to show Total Profit (values) by Year (rows). How much profit has AdventureWorks earned so far in 2022?

Year	Total Revenue	Total Cost	Total Profit
2020	$64,04,933.58	$38,03,328.35	$26,01,605.23
2021	$93,24,203.79	$53,57,171.92	$39,67,031.87
2022	$91,85,449.45	$52,96,486.05	$38,88,963.40
Total	**$2,49,14,586.82**	**$1,44,56,986.32**	**$1,04,57,600.50**

Running Sum

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

TIME INTELLIGENCE

Time Intelligence patterns are used to calculate common date-based comparisons

Performance To-Date

```
=CALCULATE(Measure, DATESYTD(Calendar[Date]))
```

Use DATESYTD for Years, DATESQTD for Quarters, DATESMTD for Months.

Previous Period

```
=CALCULATE(Measure,
DATEADD(Calendar[Date], -1, MONTH))
```

Select an interval (DAY, MONTH, QUARTER, or YEAR) and the # of intervals to compare (e.g. previous month, rolling 10-day)

Running Total

```
=CALCULATE(Measure,
DATESINPERIOD(Calendar[Date],
MAX(Calendar[Date]), -10, DAY))
```

PRO TIP:
To calculate a moving average, use the running total calculation above and divide by the number of intervals

```
YTD Revenue =
    CALCULATE(
        [Total Revenue],
        DATESYTD(
            'Calendar Lookup'[Date]
        )
    )
```

```
YTD Revenue = CALCULATE([Revenue] , DATESYTD('Calendar Lookup'[Date]))
```

Start of Year	Revenue	YTD Revenue
01-01-2020	**$64,04,933.5803**	**$64,04,933.5803**
01-01-2020	$5,85,312.6486	$5,85,312.6486
01-02-2020	$5,32,226.2458	$11,17,538.8944
01-03-2020	$6,43,436.104	$17,60,974.9984
01-04-2020	$6,53,364.0368	$24,14,339.0352
01-05-2020	$6,59,325.8968	$30,73,664.932
01-06-2020	$6,69,988.6696	$37,43,653.6016
01-07-2020	$4,86,115.0054	$42,29,768.607
01-08-2020	$5,36,452.8175	$47,66,221.4245
01-09-2020	$3,44,062.8749	$51,10,284.2994
01-10-2020	$4,04,276.5974	$55,14,560.8968
01-11-2020	$3,26,611.1534	$58,41,172.0502
01-12-2020	$5,63,761.5301	$64,04,933.5803
01-01-2021	**$93,24,203.7917**	**$93,24,203.7917**
01-01-2021	$4,32,425.7362	$4,32,425.7362
01-02-2021	$4,74,162.7875	$9,06,588.5237
Total	**$2,49,14,586.8193**	**$91,85,449.4473**

Year	Total Revenue	YTD Revenue
2020	**$64,04,934**	**$64,04,934**
January	$5,85,313	$5,85,313
February	$5,32,226	$11,17,539
March	$6,43,436	$17,60,975
April	$6,53,364	$24,14,339
May	$6,59,326	$30,73,665
June	$6,69,989	$37,43,654
July	$4,86,115	$42,29,769
August	$5,36,453	$47,66,221
September	$3,44,063	$51,10,284
October	$4,04,277	$55,14,561
November	$3,26,611	$58,41,172
December	$5,63,762	$64,04,934
Total	**$2,49,14,587**	**$91,85,449**

```
Previous Month Revenue =
    CALCULATE(
        [Total Revenue],
        DATEADD(
            'Calendar Lookup'[Date],
            -1,
            MONTH))
```

```
DATEADD(Dates, NumberOfIntervals, Interval)
```

Moves the given set of dates by a specified interval.

Year	Total Revenue	YTD Revenue	Previous Month Revenue
2020	**$64,04,934**	**$64,04,934**	**$58,41,172**
January	$5,85,313	$5,85,313	
February	$5,32,226	$11,17,539	$5,85,313
March	$6,43,436	$17,60,975	$5,32,226
April	$6,53,364	$24,14,339	$6,43,436
May	$6,59,326	$30,73,665	$6,53,364
June	$6,69,989	$37,43,654	$6,59,326
July	$4,86,115	$42,29,769	$6,69,989
August	$5,36,453	$47,66,221	$4,86,115
September	$3,44,063	$51,10,284	$5,36,453
October	$4,04,277	$55,14,561	$3,44,063
November	$3,26,611	$58,41,172	$4,04,277
December	$5,63,762	$64,04,934	$3,26,611
Total	**$2,49,14,587**	**$91,85,449**	**$2,30,87,600**

10% growth month on month

```
Revenue Target =
    [Previous Month Revenue] * 1.1
```

Year	YTD Revenue	Previous Month Revenue	Revenue Target
2020	**$64,04,934**	**$58,41,172**	**$64,25,289**
January	$5,85,313		
February	$11,17,539	$5,85,313	$6,43,844
March	$17,60,975	$5,32,226	$5,85,449
April	$24,14,339	$6,43,436	$7,07,780
May	$30,73,665	$6,53,364	$7,18,700
June	$37,43,654	$6,59,326	$7,25,258
July	$42,29,769	$6,69,989	$7,36,988
August	$47,66,221	$4,86,115	$5,34,727
September	$51,10,284	$5,36,453	$5,90,098
October	$55,14,561	$3,44,063	$3,78,469
November	$58,41,172	$4,04,277	$4,44,704
December	$64,04,934	$3,26,611	$3,59,272
Total	**$91,85,449**	**$2,30,87,600**	**$2,53,96,360**

```
10-Day Rolling Revenue =
    CALCULATE(
        [Total Revenue],
        DATESINPERIOD(
            'Calendar Lookup'[Date],
            MAX('Calendar Lookup'[Date]),
            -10,
            DAY))
```

Year	Total Revenue	10-Day Rolling Revenue
1	$8,351	$8,351
2	$14,313	$22,665
3	$28,041	$50,706
4	$17,713	$68,419
5	$7,856	$76,275
6	$21,266	$97,541
7	$8,555	$1,06,096
8	$25,365	$1,31,461
9	$14,313	$1,45,774
10	$14,110	$1,59,884
11	$31,620	$1,83,152
12	$25,048	$1,93,887
13	$7,856	$1,73,701
Total	**$2,49,14,587**	**$6,16,274**

ASSIGNMENT: TIME INTELLIGENCE

Add the following measures to the model:

1. Previous Month Returns
2. Previous Month Orders
3. Previous Month Profit
4. Order Target (10% increase over previous month)
5. Profit Target (10% increase over previous month)
6. 90-day Rolling Profit

```
Previous Month Returns =
    CALCULATE(
        [Total Returns],
        DATEADD(
            'Calendar Lookup'[Date],
            -1,
            MONTH))
```

```
Previous Month Order =
    CALCULATE(
        [Total Orders],
        DATEADD(
            'Calendar Lookup'[Date],
            -1,
            MONTH))
```

```
Previous Month Profit =
    CALCULATE(
        [Total Profit],
        DATEADD(
            'Calendar Lookup'[Date],
            -1,
            MONTH))
```

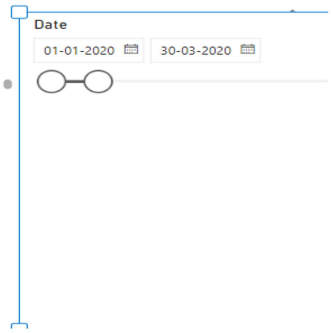
```
Order Target =
    [Previous Month Order] * 1.1
```

```
Profit Target =
    [Previous Month Profit] * 1.1
```

Year	Total Returns	Previous Month Returns	Total Orders	Order Target	Previous Month Order	Total Profit	Profit Target	Previous Month Profit
			1					
			1					
2020	**85**	**72**	**2,630**	**2,534.40**	**2304**	**$26,01,605**	**26,01,252.67**	**$23,64,775**
January	4		184			$2,35,815		
February	4	4	165	202.40	184	$2,12,187	2,59,396.09	$2,35,815
March	9	4	198	181.50	165	$2,59,085	2,33,405.96	$2,12,187
April	14	9	204	217.80	198	$2,63,032	2,84,993.72	$2,59,085
May	11	14	206	224.40	204	$2,66,276	2,89,335.22	$2,63,032
June	4	11	212	226.60	206	$2,70,068	2,92,904.08	$2,66,276
July	3	4	247	233.20	212	$1,96,683	2,97,075.01	$2,70,068
August	6	3	278	271.70	247	$2,18,355	2,16,351.00	$1,96,683
September	2	6	196	305.80	278	$1,40,516	2,40,190.92	$2,18,355
October	10	2	223	215.60	196	$1,68,582	1,54,567.59	$1,40,516
November	5	10	191	245.30	223	$1,34,176	1,85,439.74	$1,68,582
December	13	5	326	210.10	191	$2,36,830	1,47,593.34	$1,34,176
2021	**764**	**614**	**10,695**	**9,861.50**	**8965**	**$39,67,032**	**38,65,608.27**	**$35,14,189**
January	8	13	242	358.60	326	$1,82,044	2,60,513.09	$2,36,830
February	8	8	267	266.20	242	$2,00,044	2,00,248.51	$1,82,044
March	8	8	266	293.70	267	$1,99,611	2,20,048.42	$2,00,044
April	5	8	290	292.60	266	$2,09,521	2,19,571.76	$1,99,611
May	10	5	329	319.00	290	$2,33,013	2,30,473.48	$2,09,521
June	8	10	312	361.90	329	$2,27,745	2,56,313.91	$2,33,013
July	45	8	506	343.20	312	$3,42,622	2,50,518.97	$2,27,745
Total	**1,809**	**1643**	**25,165**	**25,319.80**	**23018**	**$1,04,57,600**	**1,06,54,638.35**	**$96,86,035**

```
90 - Days Rolling Profit =
    CALCULATE(
        [Total Profit],
        DATESINPERIOD(
            'Calendar Lookup'[Date],
            MAX('Calendar Lookup'[Date]),
            -90,
            DAY))
```

Year	Total Profit	90 - Days Rolling Profit
19	$4,507	$6,02,761
20	$12,825	$6,15,586
21	$5,628	$6,21,214
22	$8,663	$6,29,876
23	$7,105	$6,36,981
24	$17,104	$6,54,085
25	$7,105	$6,61,190
26	$10,502	$6,71,692
27	$4,221	$6,75,913
28	$11,256	$6,87,169
29	$8,512	$6,95,680
30	$5,628	$7,01,308
31		$3,456
⊟ April		$3,456
Total	$7,01,308	$7,01,308



DAX BEST PRACTICES

Know when to use calculated columns vs. measures

- Use calculated columns for filtering, and measures for aggregating values

Use explicit measures, even for simple calculations

- Explicit measures can be referenced anywhere, and nested within other measures

Use fully-qualified column references in measures

- This makes your DAX more readable, and differentiates column references from measure references

Move column calculations "upstream" when possible

- Adding calculated columns at the source or in Power Query improves report speed and efficiency

Minimize the use of "expensive" iterator functions

- Use iterators with caution, especially if you are working with large tables or complex models