Calculated Columns Vs Measures

Version 1.0
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Purpose

This document covers the concept of “Difference between Calculated Columns and Measures” in Power BI. This is high level document and assumes that resource has basic knowledge of Power BI Concepts.

Introduction

In Power BI, we are able to reuse the given data set to create calculated fields as per report requirement. Below are the two ways to create these extra calculated fields :-

- Calculated Columns
- Measures

Before starting with the difference between these two types of calculations, we need to understand how these are working one by one.

So let’s begin with the explanation.

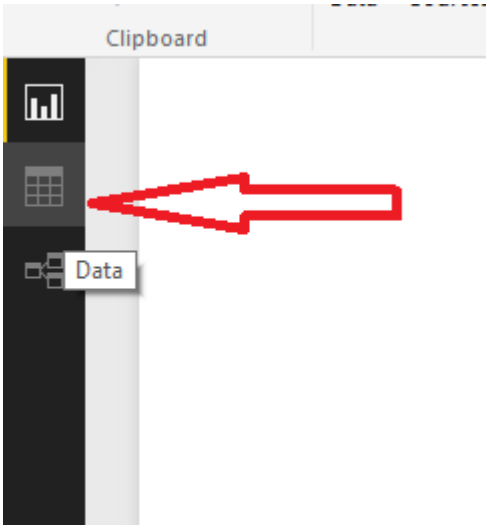
What is calculated column?

Calculated column is a part of the table in the data model. It is just like other native columns, created in a table on the given data set and can be used in any part of the report. However, we use DAX expressions to calculate the result of this column. Moreover, these columns are also used to define a relationship if required.

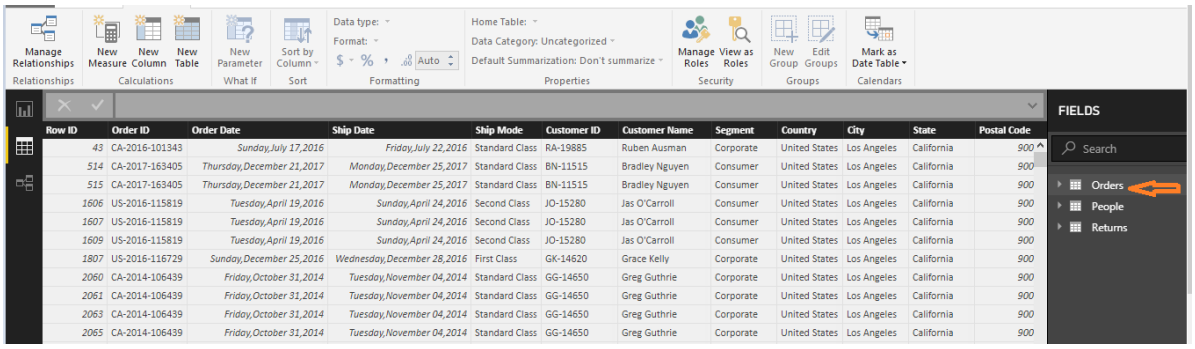
How to create a calculated column ?

1. Create any sample report on a data set.

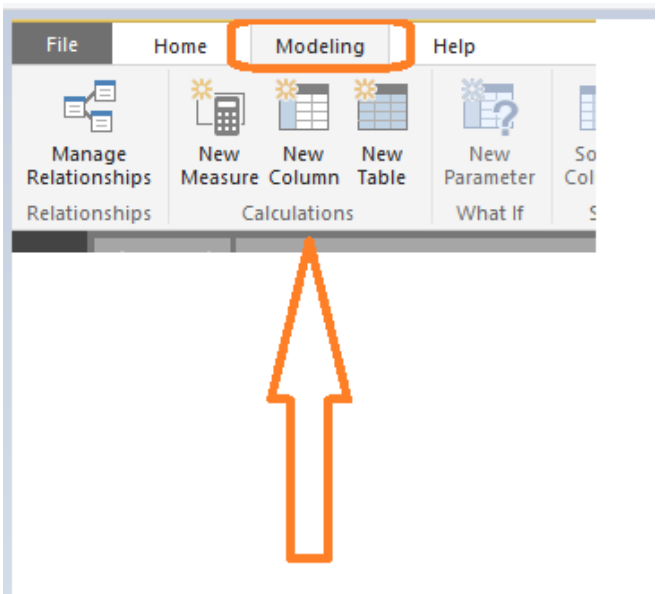
2. Go on the “Data” tab of the report.



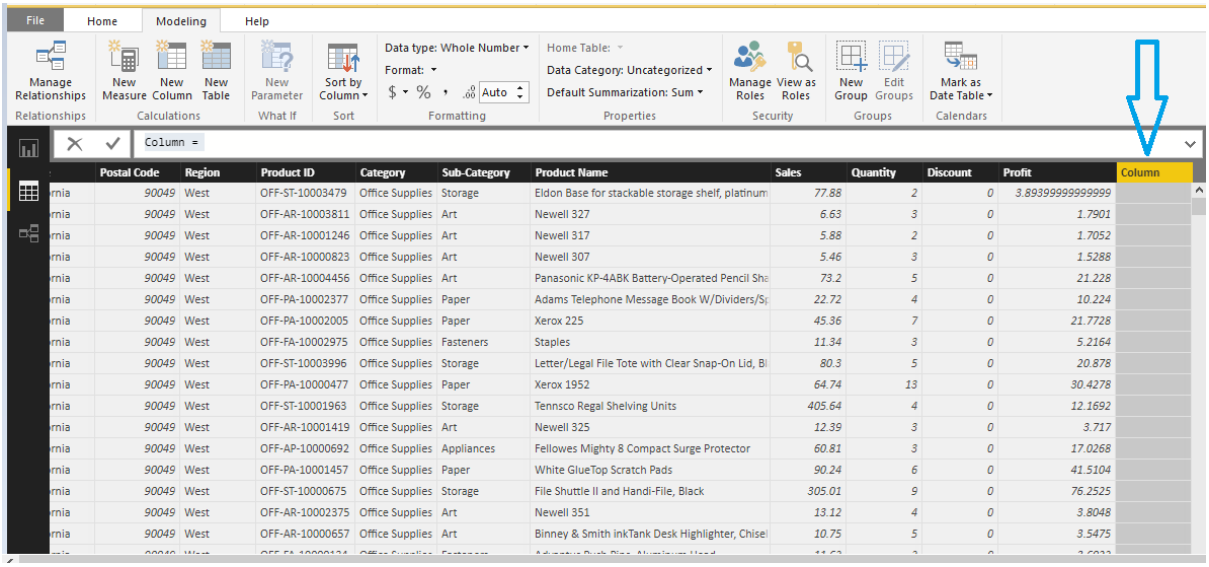
3. Below window will get opened, showing the data view of first table “Orders” by default.



4. To add a calculated column click on “Modeling” ribbon and select “New Column” option as shown in below image.

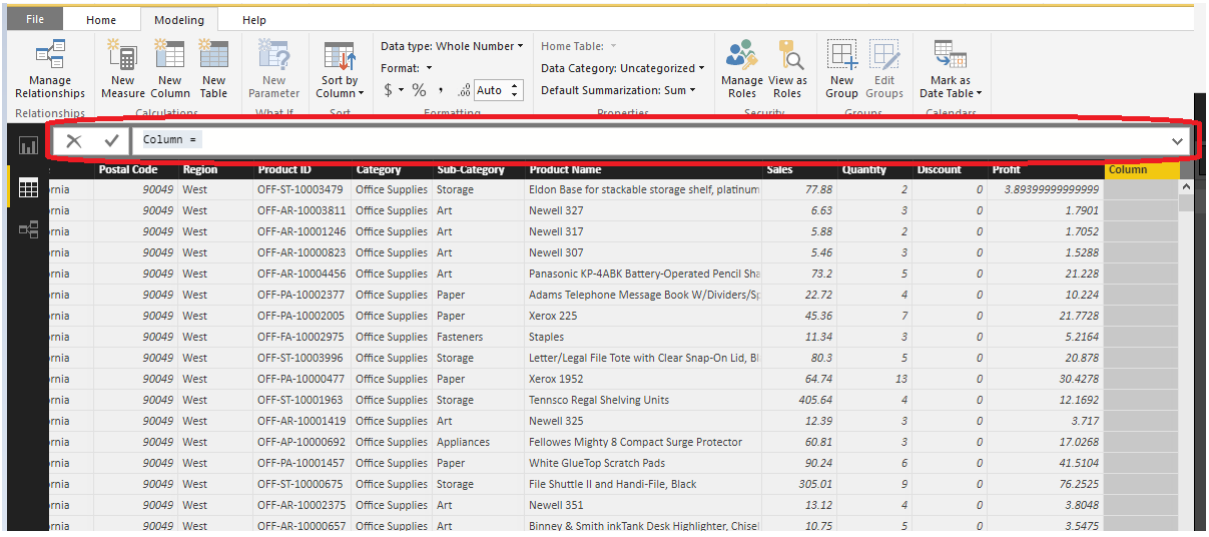


5. A new column called calculated column will be added beside the last native column in the table of a given data set.



Postal Code	Region	Product ID	Category	Sub-Category	Product Name	Sales	Quantity	Discount	Profit	Column
90049	West	OFF-ST-10003479	Office Supplies	Storage	Eldon Base for stackable storage shelf, platinum	77.88	2	0	3.89399999999999	
90049	West	OFF-AR-10003811	Office Supplies	Art	Newell 327	6.63	3	0	1.7901	
90049	West	OFF-AR-10001246	Office Supplies	Art	Newell 317	5.88	2	0	1.7052	
90049	West	OFF-AR-10000823	Office Supplies	Art	Newell 307	5.46	3	0	1.5288	
90049	West	OFF-AR-10004456	Office Supplies	Art	Panasonic KP-4ABK Battery-Operated Pencil Sha	73.2	5	0	21.228	
90049	West	OFF-PA-10002377	Office Supplies	Paper	Adams Telephone Message Book W/Dividers/Sp	22.72	4	0	10.224	
90049	West	OFF-PA-10002005	Office Supplies	Paper	Xerox 225	45.36	7	0	21.7728	
90049	West	OFF-FA-10002975	Office Supplies	Fasteners	Staples	11.34	3	0	5.2164	
90049	West	OFF-ST-10003996	Office Supplies	Storage	Letter/Legal File Tote with Clear Snap-On Lid, Bl	80.3	5	0	20.878	
90049	West	OFF-PA-10000477	Office Supplies	Paper	Xerox 1952	64.74	13	0	30.4278	
90049	West	OFF-ST-10001963	Office Supplies	Storage	Tennsco Regal Shelving Units	405.64	4	0	12.1692	
90049	West	OFF-AR-10001419	Office Supplies	Art	Newell 325	12.39	3	0	3.717	
90049	West	OFF-AP-10000692	Office Supplies	Appliances	Fellowes Mighty 8 Compact Surge Protector	60.81	3	0	17.0268	
90049	West	OFF-PA-10001457	Office Supplies	Paper	White GlueTop Scratch Pads	90.24	6	0	41.5104	
90049	West	OFF-ST-10000675	Office Supplies	Storage	File Shuttle II and Handi-File, Black	305.01	9	0	76.2525	
90049	West	OFF-AR-10002375	Office Supplies	Art	Newell 351	13.12	4	0	3.8048	
90049	West	OFF-AR-10000657	Office Supplies	Art	Binney & Smith inkTank Desk Highlighter, Chisel	10.75	5	0	3.5475	

6. Now, we will use a DAX formula in the formula bar highlighted below to define the values of the calculated column.



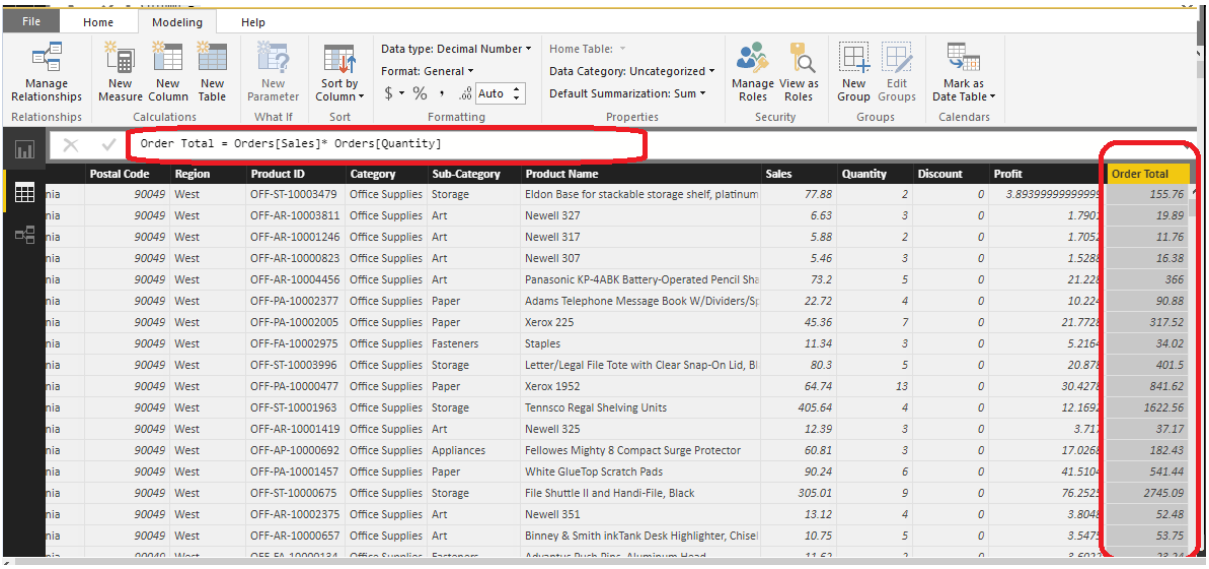
Postal Code	Region	Product ID	Category	Sub-Category	Product Name	Sales	Quantity	Discount	Profit	Column
90049	West	OFF-ST-10003479	Office Supplies	Storage	Eldon Base for stackable storage shelf, platinum	77.88	2	0	3.89399999999999	
90049	West	OFF-AR-10003811	Office Supplies	Art	Newell 327	6.63	3	0	1.7901	
90049	West	OFF-AR-10001246	Office Supplies	Art	Newell 317	5.88	2	0	1.7052	
90049	West	OFF-AR-10000823	Office Supplies	Art	Newell 307	5.46	3	0	1.5288	
90049	West	OFF-AR-10004456	Office Supplies	Art	Panasonic KP-4ABK Battery-Operated Pencil Sha	73.2	5	0	21.228	
90049	West	OFF-PA-10002377	Office Supplies	Paper	Adams Telephone Message Book W/Dividers/Sp	22.72	4	0	10.224	
90049	West	OFF-PA-10002005	Office Supplies	Paper	Xerox 225	45.36	7	0	21.7728	
90049	West	OFF-FA-10002975	Office Supplies	Fasteners	Staples	11.34	3	0	5.2164	
90049	West	OFF-ST-10003996	Office Supplies	Storage	Letter/Legal File Tote with Clear Snap-On Lid, Bl	80.3	5	0	20.878	
90049	West	OFF-PA-10000477	Office Supplies	Paper	Xerox 1952	64.74	13	0	30.4278	
90049	West	OFF-ST-10001963	Office Supplies	Storage	Tennsco Regal Shelving Units	405.64	4	0	12.1692	
90049	West	OFF-AR-10001419	Office Supplies	Art	Newell 325	12.39	3	0	3.717	
90049	West	OFF-AP-10000692	Office Supplies	Appliances	Fellowes Mighty 8 Compact Surge Protector	60.81	3	0	17.0268	
90049	West	OFF-PA-10001457	Office Supplies	Paper	White GlueTop Scratch Pads	90.24	6	0	41.5104	
90049	West	OFF-ST-10000675	Office Supplies	Storage	File Shuttle II and Handi-File, Black	305.01	9	0	76.2525	
90049	West	OFF-AR-10002375	Office Supplies	Art	Newell 351	13.12	4	0	3.8048	
90049	West	OFF-AR-10000657	Office Supplies	Art	Binney & Smith inkTank Desk Highlighter, Chisel	10.75	5	0	3.5475	

7. There are two native columns “Sales” and “Quantity” in the table. Let us take an example where we want to know the “Order Total” for each line which could represent an individual order from a customer. To achieve this, we will use below DAX formula in the calculated column.

Formula: *Order Total = Orders[Sales]* Orders[Quantity]*

Product Name	Sales	Quantity	Discount	Profit	Column
Eldon Base for stackable storage shelf, platinu	77.88	2	0	3.89399999999999	
Newell 327	6.63	3	0	1.7901	
Newell 317	5.88	2	0	1.7052	
Newell 307	5.46	3	0	1.5288	
Panasonic KP-4ABK Battery-Operated Pencil Sh	73.2	5	0	21.228	
Adams Telephone Message Book W/Dividers/S	22.72	4	0	10.224	
Xerox 225	45.36	7	0	21.7728	
Staples	11.34	3	0	5.2164	
Letter/Legal File Tote with Clear Snap-On Lid, B	80.3	5	0	20.878	
Xerox 1952	64.74	13	0	30.4278	
Tennsco Regal Shelving Units	405.64	4	0	12.1692	
Newell 325	12.39	3	0	3.717	
Fellowes Mighty 8 Compact Surge Protector	60.81	3	0	17.0268	
White GlueTop Scratch Pads	90.24	6	0	41.5104	
File Shuttle II and Handi-File, Black	305.01	9	0	76.2525	
Newell 351	13.12	4	0	3.8048	
Binney & Smith inkTank Desk Highlighter, Chis	10.75	5	0	3.5475	
Advantus Push Pins, Aluminum Head	11.62	2	0	3.6022	
Xerox 200	12.96	2	0	6.2208	
Brites Rubber Bands, 1 1/2 oz. Box	3.96	2	0	0.0792000000000002	
Quartet Omega Colored Chalk, 12/Pack	11.68	2	0	5.4896	
Elite 5" Scissors	16.9	2	0	5.07	
Serrated Blade or Curved Handle Hand Letter	6.28	2	0	0.0628000000000002	
Premier Automatic Letter Opener	480.74	2	0	14.4222	

8. The values resulting from the applied DAX formula will be shown in the calculated column “Order Total” as seen in the following image.

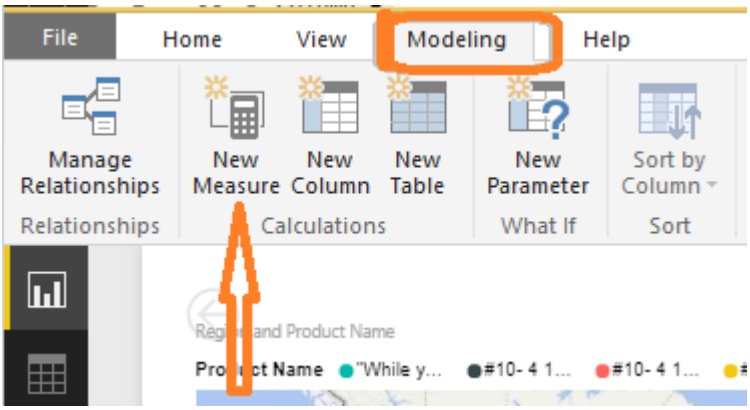


What is Measure?

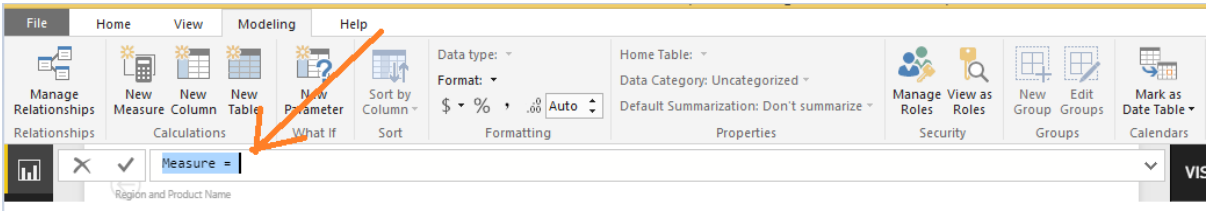
A measure is a numeric calculation which works on aggregated level basis means it is used to calculate aggregates such as sums, counts, averages, minimum or maximum values, or more advanced calculations that we create using a DAX formula. It is useful in case when we want to aggregate values from many rows in a table and don't want to compute values for each row.

How to create a Measure?

1.To create a measure, we need to click on the "New Measure" icon in the "Modelling" ribbon as highlighted in below image.

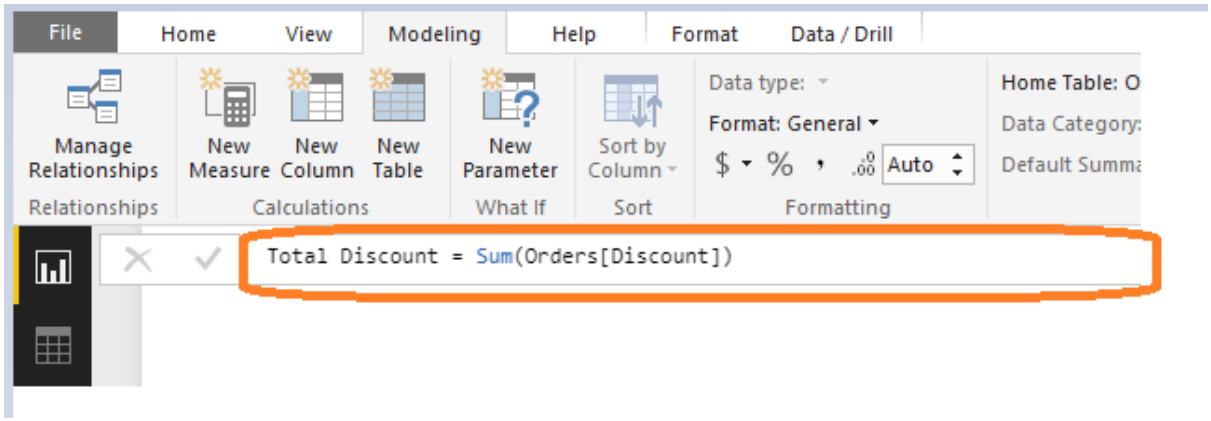


2. Use the required DAX formula in the formula bar for the created measure.

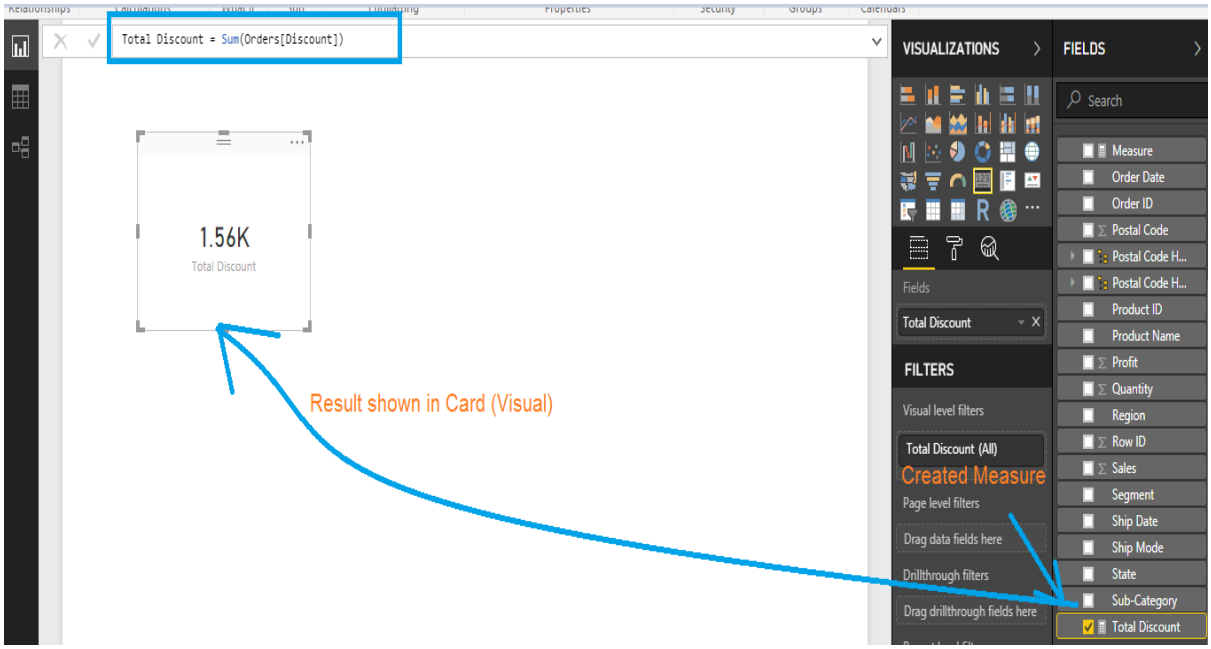


3. Lets take an example where we want to calculate the "Total Discount" given to customers for the orders. For this, we are using below DAX formula.

Formula: *Total Discount = Sum(Orders[Discount])*



4. Measures donot show up on the table. These are calculated to give a single value. We can show the result of the created measure by selecting any visual like as below:



Calculated Columns Vs Measures

Even both calculated columns and measures look quite similar, they have different uses in the reporting purpose which are described as follows:

- Calculated Columns calculates at the time of Refresh report while Measures are calculated on the fly.

- Calculated Columns are stored in the memory but the measures are not.
- Calculated columns consume memory but the measures consume CPU space.
- The values of calculated column can be seen in column in Data tab and values of measures can be seen only when it is added in the report.
- Usually, measures are the result of an aggregation but the calculated columns are the result of row by row calculation.

Thumb rule for usage

Calculated columns must be used when we want to evaluate each row in a table and measure is used when we need aggregation and need to show the result as a single value which is calculated from a given row or a table.