

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

Both **Row-Level** and **Aggregate** calculations fall under the **Basic expressions** type of calculations in Tableau

**Basic expressions** allow us to transform values or members at the **data source level of detail** (via **row-level calculations**) or at the **visualization level of detail** (via **aggregate calculations**)

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

**Step 1:** Let us start with the below mentioned Viz

**Row Shelf:** Category, Sub-Category, Order ID

**Filters Shelf:** Category (with Furniture selected)

**Text:** Profit and Sales

The screenshot shows a Tableau interface with the following configuration:

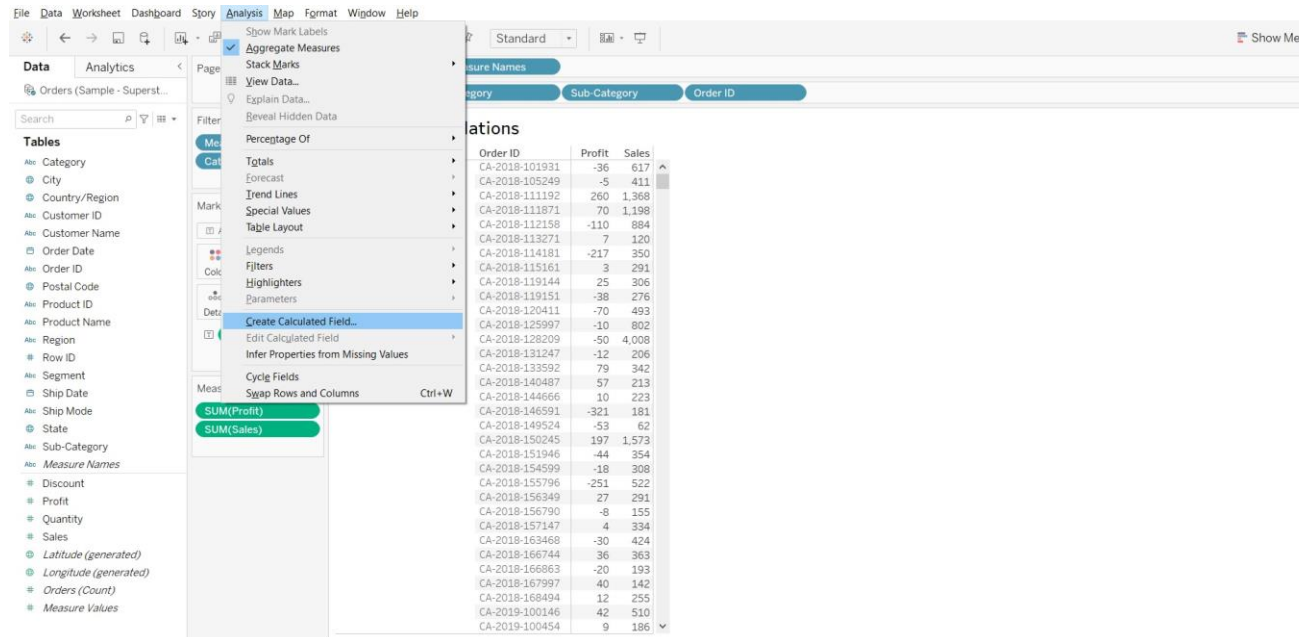
- Columns:** Measure Names
- Rows:** Category, Sub-Category, Order ID
- Filters:** Measure Names, Category: Furniture
- Marks:** Automatic (Text)
- Measure Values:** SUM(Profit), SUM(Sales)

The main view displays a table titled "Row Level Calculations" with the following data:

Category	Sub-Category	Order ID	Profit	Sales
Furniture	Bookcases	CA-2018-101931	-36	617
		CA-2018-105249	-5	411
		CA-2018-111192	260	1,368
		CA-2018-111871	70	1,198
		CA-2018-112158	-110	884
		CA-2018-113271	7	120
		CA-2018-114181	-217	350
		CA-2018-115161	3	291
		CA-2018-119144	25	306
		CA-2018-119151	-38	276
		CA-2018-120411	-70	493
		CA-2018-125997	-10	802
		CA-2018-128209	-50	4,008
		CA-2018-131247	-12	206
		CA-2018-133592	79	342
		CA-2018-140487	57	213
		CA-2018-144666	10	223
		CA-2018-146591	-321	181
		CA-2018-149524	-53	62
		CA-2018-150245	197	1,573
		CA-2018-151946	-44	354
		CA-2018-154599	-18	308
		CA-2018-155796	-251	522
		CA-2018-156349	27	291
		CA-2018-156790	-8	155
		CA-2018-157147	4	334
		CA-2018-163468	-30	424
		CA-2018-166744	36	363
		CA-2018-166863	-20	193
		CA-2018-167997	40	142
		CA-2018-168494	12	255
		CA-2019-100146	42	510
		CA-2019-100454	9	186

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

## Step 2: Create a Calculated Field for Profit/Sales Row Level



The screenshot shows the Tableau Desktop interface. The 'Analysis' menu is open, and 'Create Calculated Field...' is selected. The background shows a table of sales data with columns for Order ID, Profit, and Sales.

Order ID	Profit	Sales
CA-2018-101931	-36	617
CA-2018-105249	-5	411
CA-2018-111192	260	1,368
CA-2018-111871	70	1,198
CA-2018-112158	-110	884
CA-2018-113271	7	120
CA-2018-114181	-217	350
CA-2018-115161	3	291
CA-2018-119144	25	306
CA-2018-119151	-38	276
CA-2018-120411	-70	493
CA-2018-125997	-10	802
CA-2018-128209	-50	4,008
CA-2018-131247	-12	206
CA-2018-133592	79	342
CA-2018-140487	57	213
CA-2018-144666	10	223
CA-2018-146591	-321	181
CA-2018-149524	-53	62
CA-2018-150245	197	1,573
CA-2018-151946	-44	354
CA-2018-154599	-18	308
CA-2018-155796	-251	522
CA-2018-156349	27	291
CA-2018-156790	-8	155
CA-2018-157147	4	334
CA-2018-163468	-30	424
CA-2018-166744	36	363
CA-2018-166863	-20	193
CA-2018-167997	40	142
CA-2018-168494	12	255
CA-2019-100146	42	510
CA-2019-100454	9	186

Profit /Sales Row Level

`[Profit] / [Sales]`

The calculation is valid.

Apply

OK

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

**Step 3:** Drag and drop the **Profit/Sales Row Level** into the **Measures Values** shelf  
Change the Number format for **Profit/Sales Row Level** to **Percentage**

**Tableau Interface Details:**

- Data Source:** Orders (Sample - Superst...)
- Columns Shelf:** Measure Names
- Rows Shelf:** Category, Sub-Category, Order ID
- Measures Values Shelf:** SUM(Profit), SUM(Sales), SUM(Profit / Sales)
- Context Menu (SUM(Profit / Sales)):** Filter..., Show Filter, Format..., Include in Tooltip, Attribute, Measure (Sum), Edit in Shelf, Add Table Calculation..., Quick Table Calculation, Remove

**Row Level Calculations Table:**

Category	Sub-Category	Order ID	Profit	Sales	Profit..
Furniture	Bookcases	CA-2018-101931	-36	617	0
		CA-2018-105249	-5	411	0
		CA-2018-111192	260	1,368	0
		CA-2018-111871	70	1,198	0
		CA-2018-112158	-110	884	0
		CA-2018-113271	7	120	0
		CA-2018-114181	-217	350	-1
		CA-2018-115161	3	291	0
		CA-2018-119144	25	306	0
		CA-2018-119151	-38	276	0
		CA-2018-120411	-70	493	0
		CA-2018-125997	-10	802	0
		CA-2018-128209	-50	4,008	0
		CA-2018-131247	-12	206	0
		CA-2018-133592	79	342	0
		CA-2018-140487	57	213	0
		CA-2018-144666	10	223	0
		CA-2018-146591	-321	181	-2
		CA-2018-149524	-53	62	-1
		CA-2018-150245	197	1,573	0
		CA-2018-151946	-44	354	0
		CA-2018-154599	-18	308	0
		CA-2018-155796	-251	522	0
		CA-2018-156349	27	291	0
		CA-2018-156790	-8	155	0
		CA-2018-157147	4	334	0
		CA-2018-163468	-30	424	0
		CA-2018-166744	36	363	0
		CA-2018-166863	-20	193	0
		CA-2018-167997	40	142	0
		CA-2018-168494	12	255	0
		CA-2019-100146	42	510	0
		CA-2019-100454	9	186	0

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

## Step 4: Change the Number format for Profit/Sales Row Level to Percentage

Format SUM(Profit /Sal... x

Axis Pane

Default

Numbers: 12345600.0...

Automatic

Number (Standard)

Number (Custom)

Currency (Standard)

Currency (Custom)

Scientific

Percentage

Custom

Percentage

Decimal places:

2

Measure Values

SUM(Profit)

SUM(Sales)

SUM(Profit /Sales R..

Clear

Pages

Columns Measure Names

Rows Category Sub-Category Order ID

Filters Measure Names Category: Furniture

Row Level Calculations

Category	Sub-Category	Order ID	Profit	Sales	Profit/S..
Furniture	Bookcases	CA-2018-101931	-36	617	-5.88%
		CA-2018-105249	-5	411	-1.18%
		CA-2018-111192	260	1,368	19.00%
		CA-2018-111871	70	1,198	5.88%
		CA-2018-112158	-110	884	-12.50%
		CA-2018-113271	7	120	5.88%
		CA-2018-114181	-217	350	-62.00%
		CA-2018-115161	3	291	1.18%
		CA-2018-119144	25	306	8.24%
		CA-2018-119151	-38	276	-13.75%
		CA-2018-120411	-70	493	-14.29%
		CA-2018-125997	-10	802	-1.25%
		CA-2018-128209	-50	4,008	-1.25%
		CA-2018-131247	-12	206	-5.88%
		CA-2018-133592	79	342	23.00%
		CA-2018-140487	57	213	27.00%
		CA-2018-144666	10	223	4.71%
		CA-2018-146591	-321	181	-176.67%
		CA-2018-149524	-53	62	-86.00%
		CA-2018-150245	197	1,573	12.50%
		CA-2018-151946	-44	354	-12.50%
		CA-2018-154599	-18	308	-5.88%
		CA-2018-155796	-251	522	-48.00%
		CA-2018-156349	27	291	9.41%
		CA-2018-156790	-8	155	-5.00%
		CA-2018-157147	4	334	1.18%
		CA-2018-163468	-30	424	-7.14%
		CA-2018-166744	36	363	10.00%
		CA-2018-166863	-20	193	-10.29%
		CA-2018-167997	40	142	28.00%
		CA-2018-168494	12	255	4.71%
		CA-2019-100146	42	510	8.24%
		CA-2019-100454	9	186	5.00%

Data Source

Row Level Calculations

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

## Step 5: Create a Calculated Field for **Profit/Sales Aggregate**

Profit/Sales Aggregate

×

`SUM([Profit])/SUM([Sales])|`

The calculation is valid.

Apply

OK

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

**Step 6:** Drag and drop the **Profit/Sales Aggregate** into the **Measures Values** shelf

The screenshot shows the Tableau interface with the following components:

- Columns Shelf:** Measure Names
- Rows Shelf:** Category, Sub-Category, Order ID
- Filters Shelf:** Measure Names, Category: Furniture
- Marks Shelf:** Automatic (dropdown), Color, Size, Text, Detail, Tooltip, Measure Values (dropdown)
- Measure Values Shelf:** SUM(Profit), SUM(Sales), SUM(Profit / Sales R..), AGG(Profit/Sales Ag..)

The main view displays a table titled "Aggregate Calculations" with the following data:

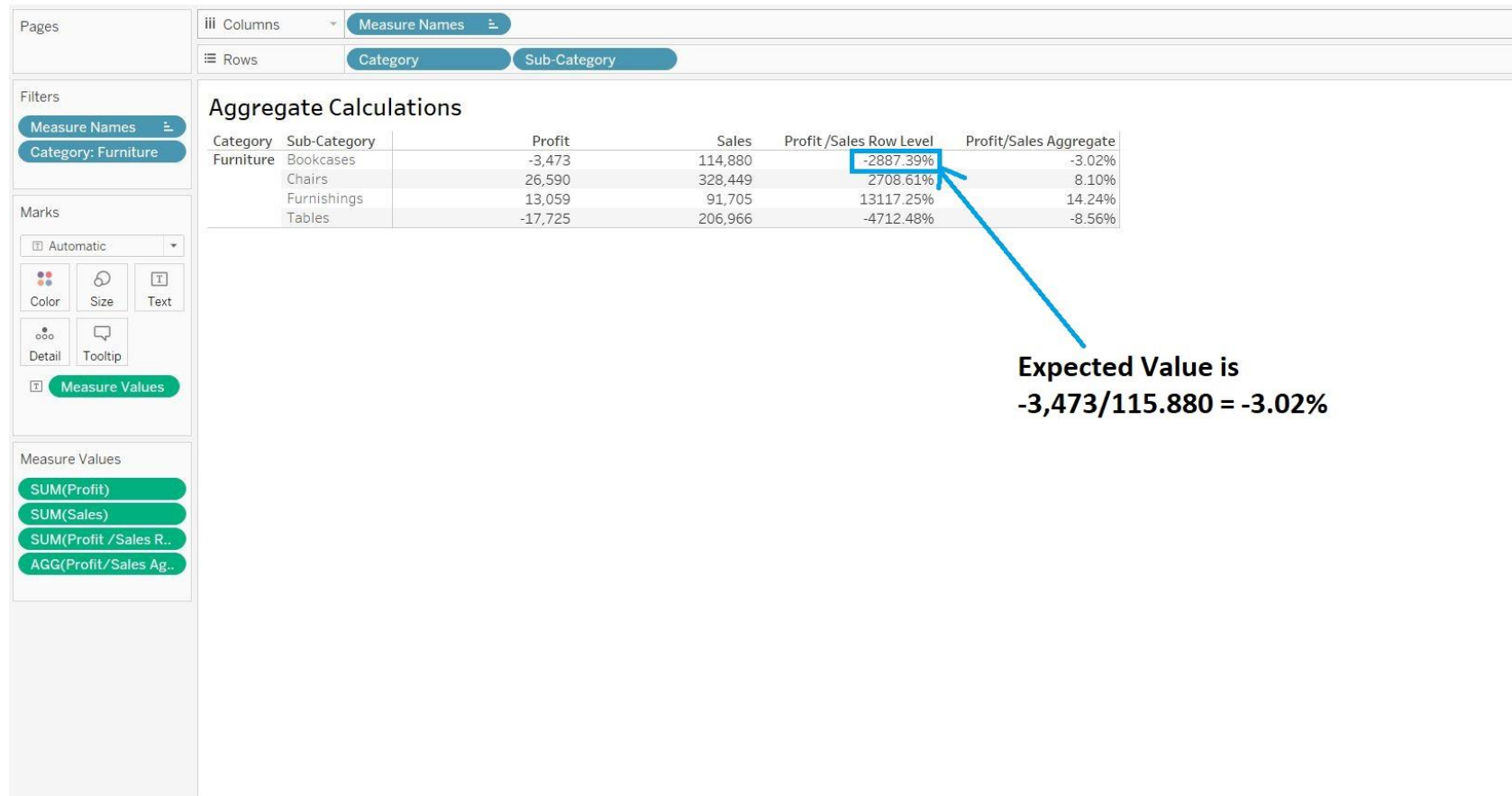
Category	Sub-Category	Order ID	Profit	Sales	Profit /Sales Row Level	Profit/Sales Aggregate
Furniture	Bookcases	CA-2018-101931	-36	617	-5.88%	-5.88%
		CA-2018-105249	-5	411	-1.18%	-1.18%
		CA-2018-111192	260	1,368	19.00%	19.00%
		CA-2018-111871	70	1,198	5.88%	5.88%
		CA-2018-112158	-110	884	-12.50%	-12.50%
		CA-2018-113271	7	120	5.88%	5.88%
		CA-2018-114181	-217	350	-62.00%	-62.00%
		CA-2018-115161	3	291	1.18%	1.18%
		CA-2018-119144	25	306	8.24%	8.24%
		CA-2018-119151	-38	276	-13.75%	-13.75%
		CA-2018-120411	-70	493	-14.29%	-14.29%
		CA-2018-125997	-10	802	-1.25%	-1.25%
		CA-2018-128209	-50	4,008	-1.25%	-1.25%
		CA-2018-131247	-12	206	-5.88%	-5.88%
		CA-2018-133592	79	342	23.00%	23.00%
		CA-2018-140487	57	213	27.00%	27.00%
		CA-2018-144666	10	223	4.71%	4.71%
		CA-2018-146591	-321	181	-176.67%	-176.67%
		CA-2018-149524	-53	62	-86.00%	-86.00%
		CA-2018-150245	197	1,573	12.50%	12.50%
		CA-2018-151946	-44	354	-12.50%	-12.50%
		CA-2018-154599	-18	308	-5.88%	-5.88%
		CA-2018-155796	-251	522	-48.00%	-48.00%
		CA-2018-156349	27	291	9.41%	9.41%
		CA-2018-156790	-8	155	-5.00%	-5.00%
		CA-2018-157147	4	334	1.18%	1.18%
		CA-2018-163468	-30	424	-7.14%	-7.14%
		CA-2018-166744	36	363	10.00%	10.00%
		CA-2018-166863	-20	193	-10.29%	-10.29%
		CA-2018-167997	40	142	28.00%	28.00%
		CA-2018-168494	12	255	4.71%	4.71%
		CA-2019-100146	42	510	8.24%	8.24%
		CA-2019-100454	9	186	5.00%	5.00%

If **Order ID** is present in the View, there is no difference between the **Row-Level** and **Aggregate** calculations  
This is because **Order ID** is the **lowest level of granularity** in the Superstore dataset



# ROW-LEVEL Vs AGGREGATE CALCULATIONS

**Step 7:** Let us move to a higher level of detail (decrease the granularity) i.e., **Sub-Category**. Remove the **Order ID** from **Rows** shelf  
We observe that now there is a difference between the Row-Level and Aggregate calculations.  
It looks like the **Profit/Sales Row Level** calculation is incorrect





# ROW-LEVEL Vs AGGREGATE CALCULATIONS

## Step 8: Analysis > Totals > Add All Subtotals

The screenshot displays the Tableau Desktop interface. The 'Analysis' menu is open, showing the 'Totals' submenu with 'Add All Subtotals' selected. The 'Marks' pane on the right shows a table of calculations with columns: Sales, Profit/Sales Row Level, and Profit/Sales Aggregate. The table contains data for three rows, with the first row highlighted. The 'Data' pane on the left shows a list of fields, including 'Category', 'City', 'Country/Region', 'Customer ID', 'Customer Name', 'Order Date', 'Order ID', 'Postal Code', 'Product ID', 'Product Name', 'Region', 'Row ID', 'Segment', 'Ship Date', 'Ship Mode', 'State', 'Sub-Category', 'Measure Names', 'Discount', 'Profit', 'Profit /Sales Row Level', 'Profit/Sales Aggregate', 'Quantity', 'Sales', 'Latitude (generated)', 'Longitude (generated)', 'Orders (Count)', and 'Measure Values'.

	Sales	Profit/Sales Row Level	Profit/Sales Aggregate
	114,880	-2887.39%	-3.02%
	328,449	2708.61%	8.10%
	91,705	13117.25%	14.24%
	206,966	-4712.48%	-8.56%

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

**Step 9:** The SUM of **Profit/Sales Row Level** seems to be a very inflated figure as compared to **Profit/Sales Aggregate**

**Profit/Sales Row Level: 8225.99%**

**Profit/Sales Aggregate: 2.49%**

The screenshot displays a Tableau interface with the following components:

- Columns:** Measure Names
- Rows:** Category, Sub-Category
- Filters:** Measure Names, Category: Furniture
- Marks:** Automatic (Color, Size, Text, Detail, Tooltip), Measure Values
- Measure Values:** SUM(Profit), SUM(Sales), SUM(Profit /Sales R...), AGG(Profit/Sales Ag..)

The main table, titled "Aggregate Calculations", shows the following data:

Category	Sub-Category	Profit	Sales	Profit /Sales Row Level	Profit/Sales Aggregate
Furniture	Bookcases	-3,473	114,880	-2887.39%	-3.02%
	Chairs	26,590	328,449	2708.61%	8.10%
	Furnishings	13,059	91,705	13117.25%	14.24%
	Tables	-17,725	206,966	-4712.48%	-8.56%
	Total	18,451	742,000	8225.99%	2.49%

Annotations in the image:

- An arrow points from the text "Unexpected and Inflated Value" to the red box around the 8225.99% value.
- An arrow points from the text "Accurate Value" to the green box around the 2.49% value.

# ROW-LEVEL Vs AGGREGATE CALCULATIONS

**Step 10:** Let us move to the next higher level of detail (further decrease the granularity)

Remove the **Sub-Category** from **Rows** Shelf

Even at this level of granularity the **Profit/Sales Aggregate** value seems to be correct

The screenshot shows a Tableau interface with the following configuration:

- Columns Shelf:** Measure Names
- Rows Shelf:** Category
- Filters:** Measure Names, Category: Furniture
- Marks:** Automatic (Table mark type), Measure Values
- Measure Values:** SUM(Profit), SUM(Sales), SUM(Profit / Sales R..), AGG(Profit/Sales Ag..)

The main view displays a table titled "Aggregate Calculations" with the following data:

Category	Profit	Sales	Profit /Sales Row Level	Profit/Sales Aggregate
Furniture	18,451	742,000	8225.99%	2.49%

The values 8225.99% and 2.49% are highlighted with red and green boxes, respectively.

# DIFFERENCE BETWEEN ROW-LEVEL AND AGGREGATE CALCULATIONS

Row-Level Calculations	Aggregate Calculations
Performed on a <b>row by row level</b>	Performed based on <b>viz level of detail</b>
By default, first the <b>operation</b> is performed and next the <b>aggregation</b> is carried out	<b>Aggregation</b> is included in the calculation formula itself First <b>aggregation</b> is performed and next the <b>operation</b> is carried out
<b>Drawbacks on performance and speed</b>	<b>Better performance</b> with lesser queries
We may get inflated and <b>unexpected results</b> in case the dimensionality is changed i.e. move to a higher level of detail from Order ID to Sub-Category	Provides <b>accurate results</b> at any <b>dimensionality</b>