



Text for Previous Video on Calculated Fields

Calculated fields

There will be times when you want to look at something but there isn't a specific field for it. For instance, maybe you want to know the profit per item for each order record. It seems pretty simple, just divide profit by order for each record, then aggregate it, but how do you actually do the division in Tableau?

The answer is **calculated fields**. Calculated fields let you create new fields to use in your visualizations. If you have experience working with formulas in Excel, creating calculated fields should feel pretty similar.

To create a calculated field, open the menu on a field (such as **Profit**), then Create > Calculated Field.... (See below). You can also create one by clicking on "Analysis" in the top menu bar, then selected "Create Calculated Field..."



Text: Calculated Fields

The screenshot shows the Tableau interface with the 'Add to Sheet' context menu open for the 'Profit' measure. The menu options are:

- Add to Sheet
- Duplicate
- Rename
- Hide
- Create (highlighted)
- Convert to Discrete
- Convert to Dimension
- Change Data Type
- Geographic Role
- Default Properties
- Group by
- Folders
- Replace References...
- Describe...

The 'Create' option is highlighted, and a sub-menu is open showing the following options:

- Calculated Field... (highlighted)
- Group...
- Bins...
- Parameter...

The Measures list on the left includes:

- Discount
- Profit (highlighted)
- Quantity
- Sales
- Shipping Cost

You should see the editor:



Text: Calculated Fields

If you don't see the functions panel, click on the little triangle on the right edge of the editor.

Fields in the editor show up in brackets, like **[Profit]**. You can do simple arithmetic here, like adding a constant, or multiplying the field. You can also use functions such as absolute value, sine, square root, etc. If you want to make a field all positive, you'd do **ABS([Profit])**. There is a list of functions on the right and some short documentation is shown when you select one.

Here we want to create a new field that calculates the profit per item for each record. It's pretty simple, just **[Profit]/[Quantity]** which I've done below. I also renamed the calculated field to "Profit per item".



Text: Calculated Fields

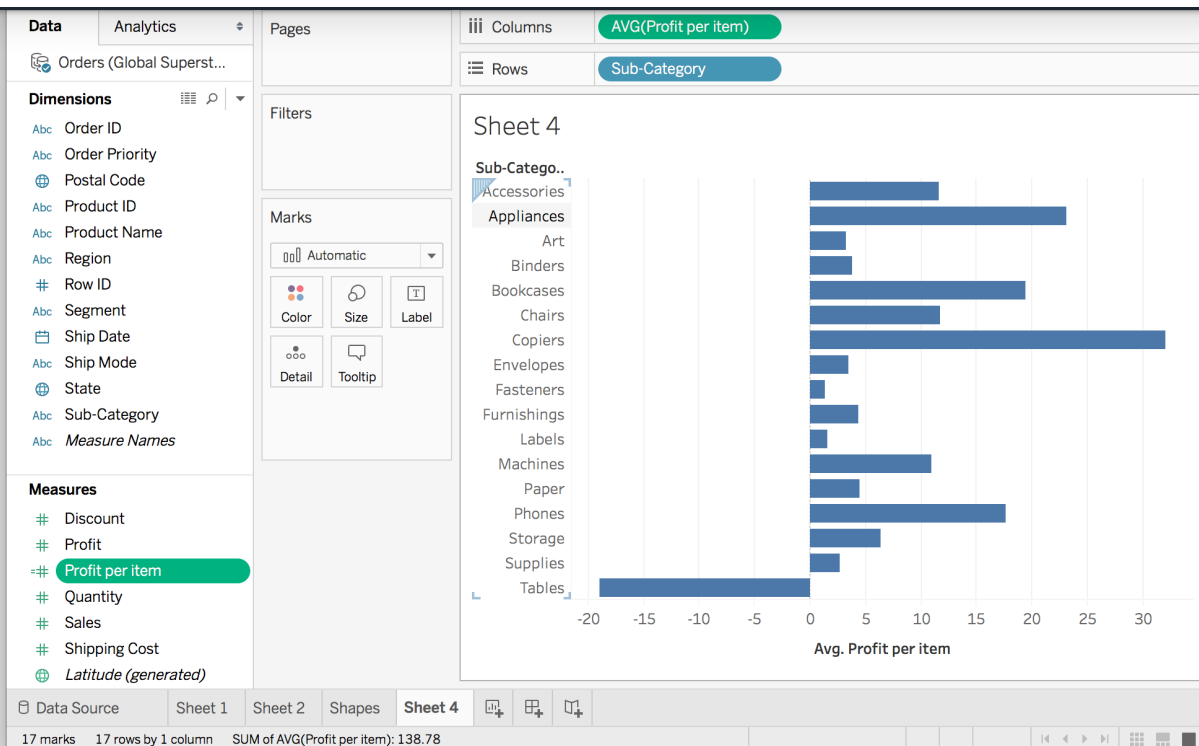
The screenshot shows the Tableau Desktop interface. The 'Data' pane on the left lists dimensions: Order ID, Order Priority, Postal Code, Product ID, and Product Name. The 'Columns' shelf contains 'Sub-Category'. The 'Rows' shelf is empty. The 'Marks' shelf is set to 'Auto'. A dialog box titled 'Profit per item' is open, showing the formula $[Profit]/[Quantity]$. The 'Profit' field is highlighted in the 'Dimensions' list. The dialog box has 'Apply' and 'OK' buttons. The 'OK' button is highlighted in green. The 'Profit' field is also shown in the 'Columns' shelf with a 'Data type: Float' label. The 'Profit' field is also shown in the 'Dimensions' list with a 'Data type: Float' label. The 'Profit' field is also shown in the 'Columns' shelf with a 'Data type: Float' label. The 'Profit' field is also shown in the 'Dimensions' list with a 'Data type: Float' label.

Sub-Category	Profit
Accessories	Abc
Appliances	Abc
Phones	Abc
Storage	Abc
Supplies	Abc
Tables	Abc

Once you hit "OK" and create it, the new field shows up in the data pane. You can use it just like any other field. I made a plot of the average profit per item for each sub-category.



Text: Calculated Fields

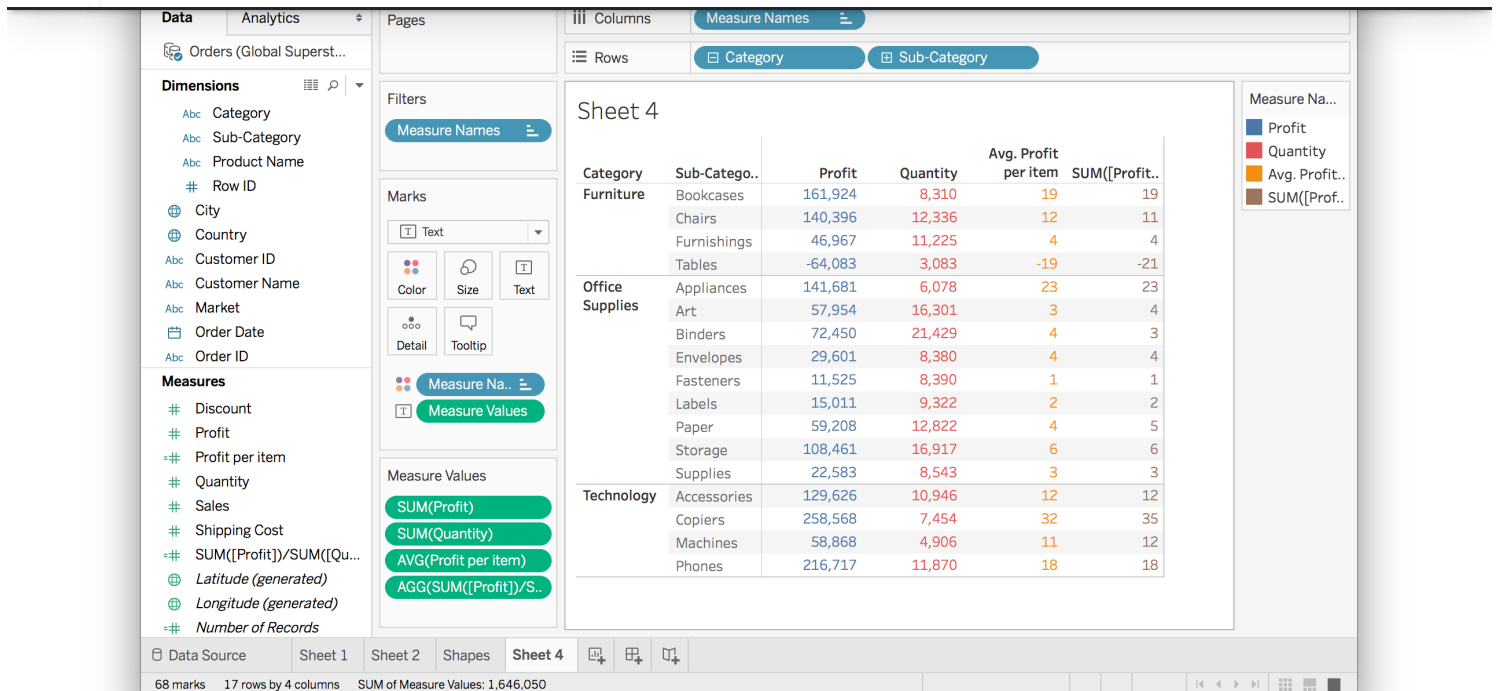


You can see the **Profit per item** field on the left. The little equals sign **=#** next to the name means it is a calculated field. Now this field has the profit per item for each record. We want to know the average profit per item for each sub-category, so drag it to Columns and do an average aggregation.

Aggregation in Calculated Fields

You can also do aggregation directly in a calculated field. For instance, we can also calculate the profit per item by **SUM([Profit])/SUM([Quantity])**. The **SUM()** functions are aggregations just like you do with fields in views.

Text: Calculated Fields

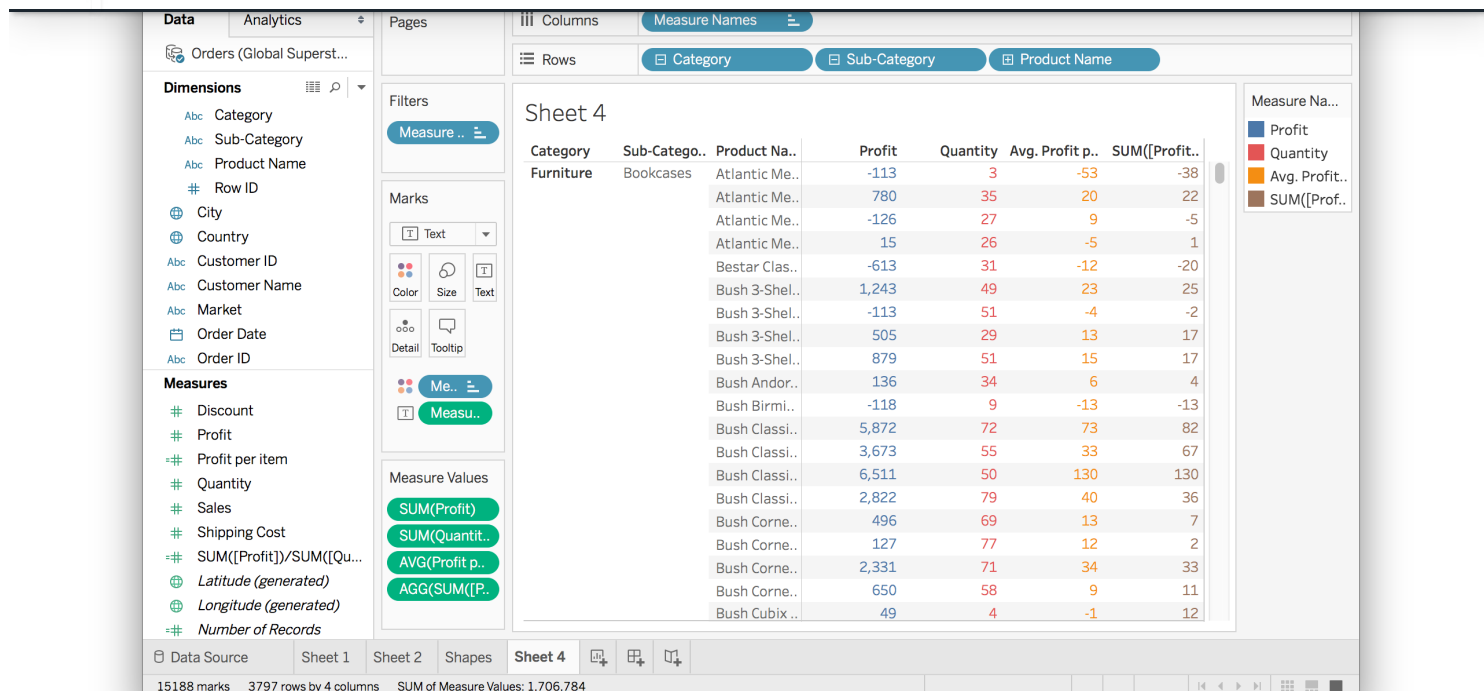


The two methods for calculating the profit per item look basically the same, but there are some discrepancies like in "Tables". I'm going to look at this a little closer so you can see how Tableau works a bit better.

If I expand the table to products...

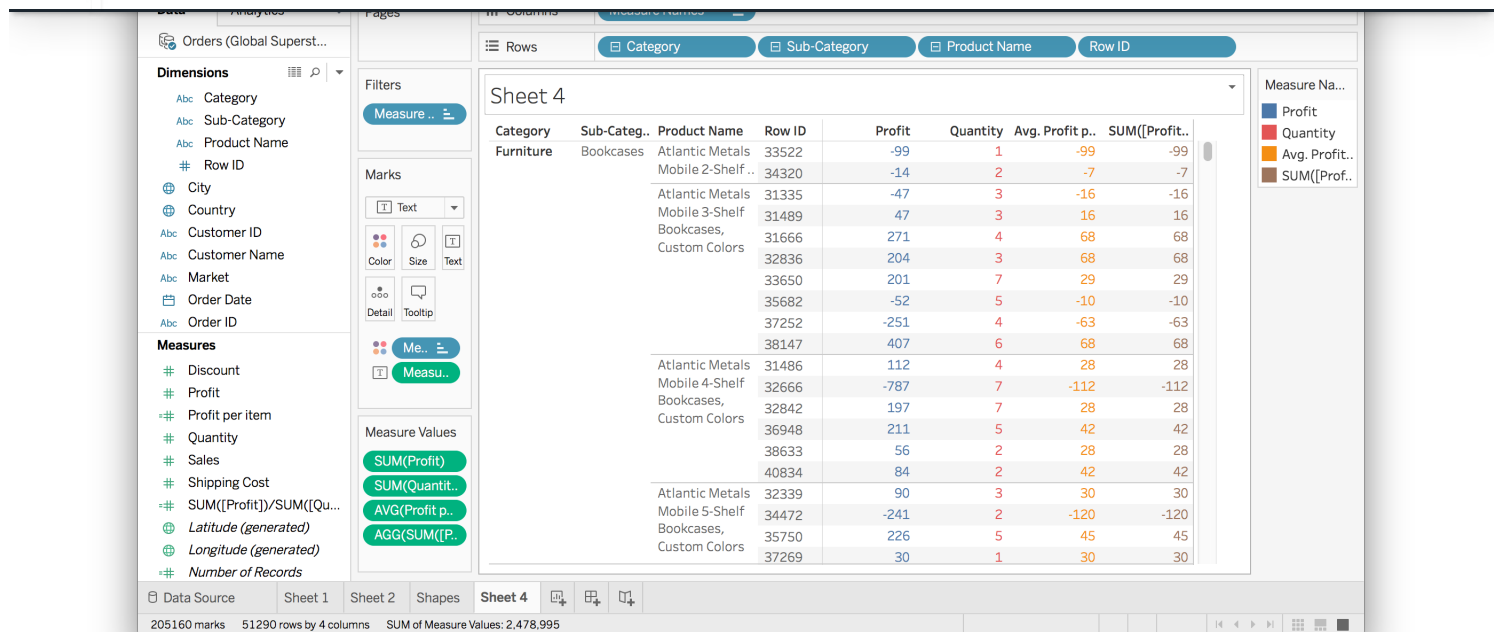


Text: Calculated Fields



Now we see there are some weird things going on. A lot of the results from the two methods are extremely different. The third product has a profit per item of \$9 or -\$5. Looking at the values of Profit and Quantity, it appears that the aggregation method ($\text{SUM}([\text{Profit}]) / \text{SUM}([\text{Quantity}])$) is doing the right thing. I'll dig down to individual records to see what's happening.

Text: Calculated Fields



At the row level, the two calculations are the same. It's the averaging of the $\frac{[Profit]}{[Quantity]}$ calculation that is causing the difference. For the the "Atlantic Mobile 4-Shelf Bookcases" product, all the ratios are correct. But when you average them, $(28-112+28+42+28+42)/6 = 9.333$, you get what we see at the product name level.

The aggregation in the other calculation takes care of that for us. It always calculates the ratios for the level of granularity we're at. You can see the columns **Profit** and **Quantity** doing the summation at the level of granularity and the ratio $\frac{SUM([Profit])}{SUM([Quantity])}$ is taken from those numbers.

The two calculations are answering different questions.

1. What is the profit ratio for a *single order* within any product or any other category level?
 - Use Average $\frac{[Profit]}{[Quantity]}$
2. What is the profit ratio at any level of a category?
 - Use $\frac{SUM([Profit])}{SUM([Quantity])}$

It's important to make sure you are answering the right question when working with data!



THEN, ELSE in calculations. For example to make a new field to categorize sales as "good" and bad", you could do:

```
IF SUM([Sales]) > 10000 THEN "Good" ELSE "Bad"
```

You'll use this pattern a lot, there is a short hand version with the function **IIF**. The function works like **IIF(conditions, if true, if false)**

```
IIF(SUM([Sales]) > 10000, "Good", "Bad")
```

Calculations with strings

Much of the time you'll find yourself working with strings (text) like the product names in this data set. In calculations, you can do things like split up words in a string, find words in a string, and concatenate strings.

Here's a great [tutorial video from Tableau](#) and [a blog post](#) with a bunch of in depth examples.

More on calculated fields

There is a lot to learn about calculate fields that's outside the scope of this lesson. If you want to know more about calculated fields, the [Tableau documentation](#) is a great place to start. As you're working with Tableau, be sure to visit the documentation often.

NEXT