Relationships and Joins

Relationships

1. Define relationships
2. Business Scenario (data model diagram)
3. Build a Tableau data source using relationships
4. Answer business questions
5. Learn the interface and functionality
   - Data pane
   - Null values
   - Calculations (single-table and multi-table)
   - Count fields (auto-generated)
6. Performance Options settings (cardinality and referential integrity)

Combine multiple tables for analysis with relationships

- Relationships are an easy, flexible way to combine data from multiple tables for analysis.
- You define relationships based on matching fields, so that during analysis, Tableau brings in the right data from the right tables at the right aggregation—handling level of detail for you.
- A data source with relationships acts like a custom data source for every viz, but you only build it once.

Relationships can help you in three key ways:

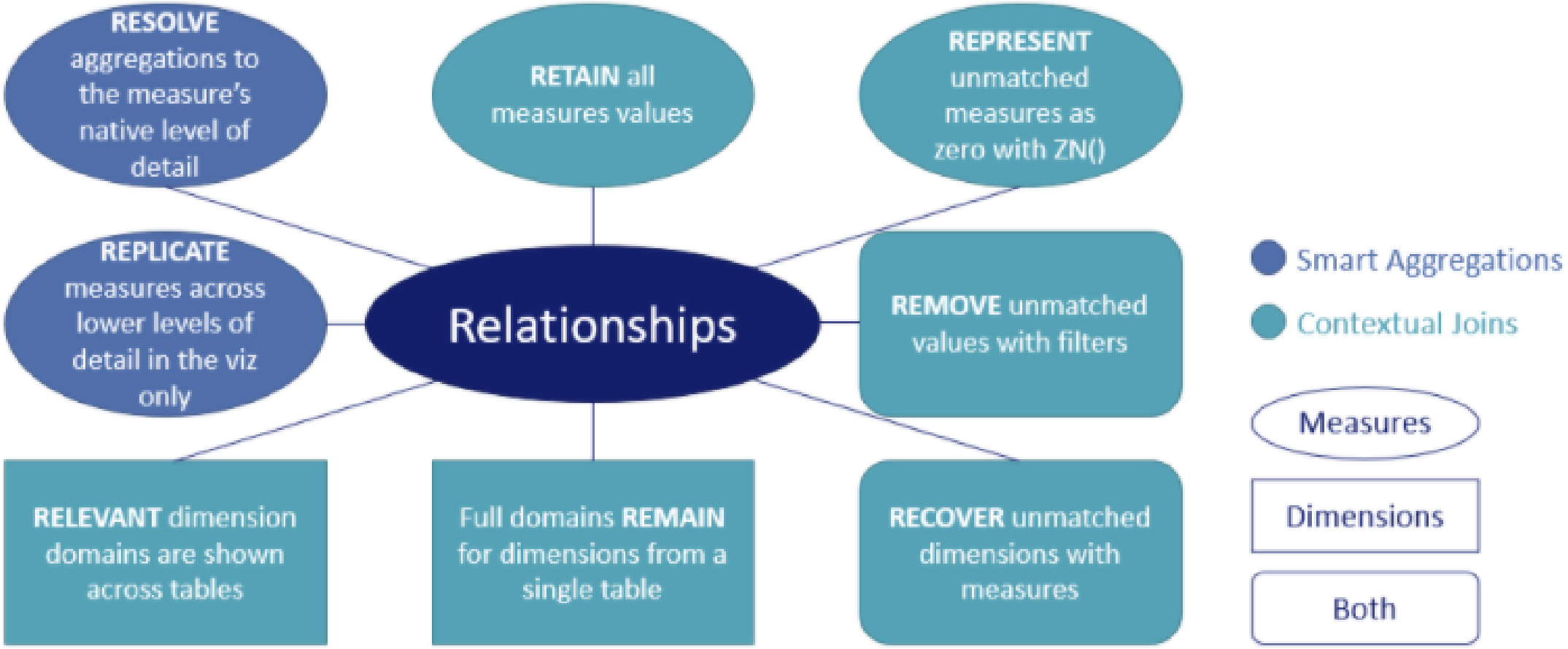
1. **Less upfront data preparation**: With relationships, Tableau automatically combines only the relevant tables at the time of analysis, preserving the right level of detail. No more pre-aggregation in custom SQL or database views!
2. **More use cases per data source**: Tableau's new multi-table logical data model means you can preserve all the detail records for multiple fact tables in a single data source. Say goodbye to different data sources for different scenarios; relationships can handle more complex data models in one place.
3. **Greater trust in results**: While joins can filter data, relationships always preserve all measures. Now important values like money can never go missing. And unlike joins, relationships won't double your trouble by duplicating data stored at different levels of detail.

The 8 Rs of relationship semantics

- Tableau needs rules to follow—semantics—to determine how to query data. Relationships have two types of semantic behavior:

1. **Smart aggregations**: Measures automatically aggregate to the level of detail of their pre-join source table. This differs from joins, where measures forget their source and adopt the level of detail of the post-join table.
2. **Contextual joins**: Unmatched values are handled individually per viz, so a single relationship simultaneously supports all join types (inner, left, right, and full)

- With contextual joins, the join type is determined based on the combination of measures and dimensions in the viz, and their source tables.


RESOLVE aggregations to the measure's native level of detail
RETAIN all measures values
REPRESENT unmatched measures as zero with ZN()
REPLICATE measures across lower levels of detail in the viz only
Relationships
REMOVE unmatched values with filters
RELEVANT dimension domains are shown across tables
Full domains REMAIN for dimensions from a single table
RECOVER unmatched dimensions with measures
Smart Aggregations
Contextual Joins
Measures
Dimensions
Both

Consider the Convenience _store datastore

Data Model Diagram

Customer Table

Customer ID	Customer Name
1	Doug
2	Sara

Transaction Table

Transaction ID	Transaction Date	Customer ID
1	May 31, 2020	1
2	May 31, 2020	2
3	Jun 1, 2020	1
4	Jun 1, 2020	

Transaction Detail Table

Transaction ID	Product ID	Quantity Sold
1	3	2
1	1	1
2	4	2
2	2	1
3	5	1
3	1	2
4	2	1
4	6	2

Product Table

Product ID	Product Name	Unit Price	Unit Cost	Category ID
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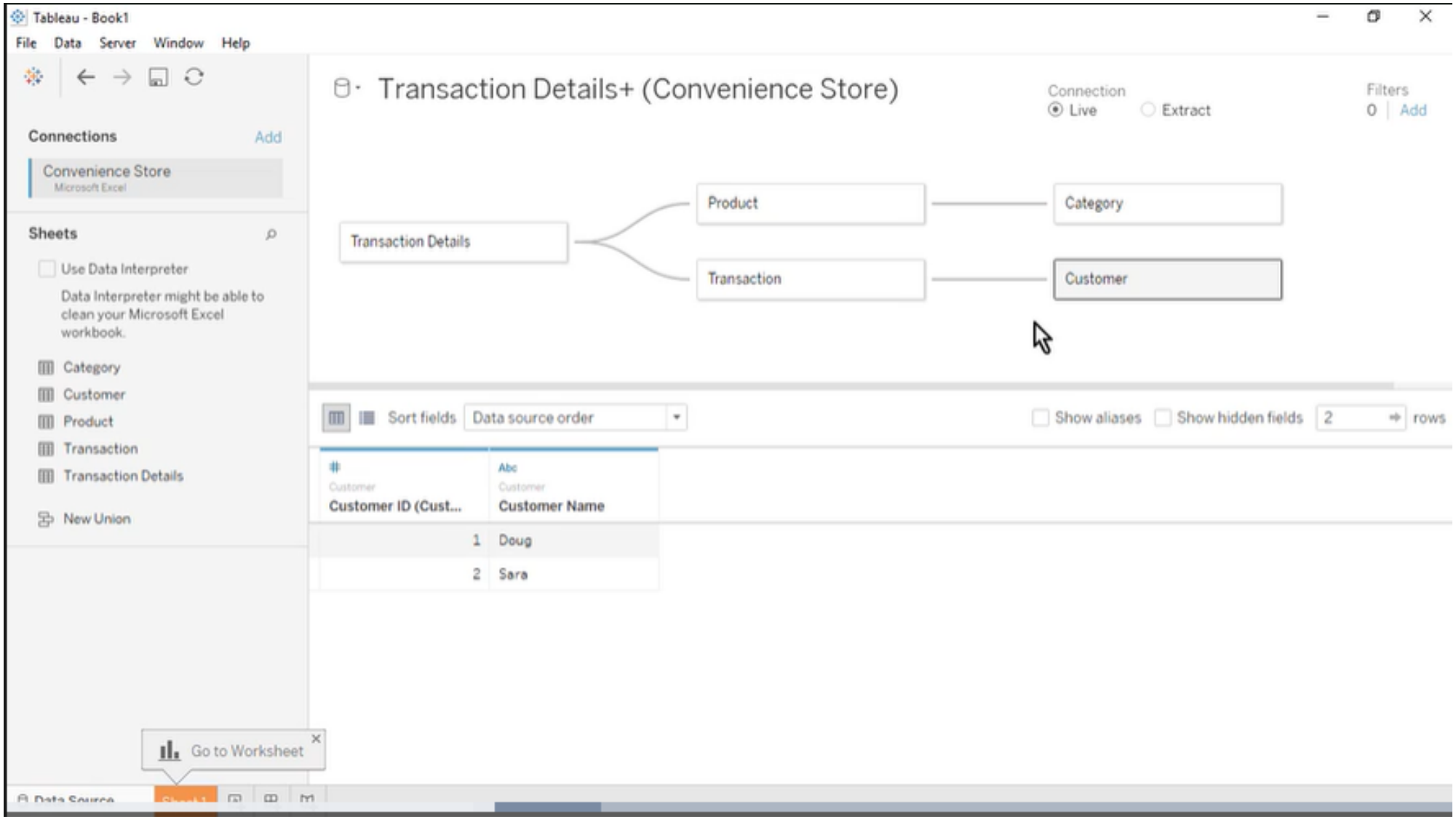
2	Juice	$2.50	$0.75	1
3	Magazine	$3.00	$0.80	2
4	Book	$5.00	$1.75	2
5	Potato Chips	$1.50	$0.50	3
6	Chocolate Bar	$2.00	$0.75	3
7	Pencil	$0.50	$0.10	4
8	Pen	$1.00	$0.40	4

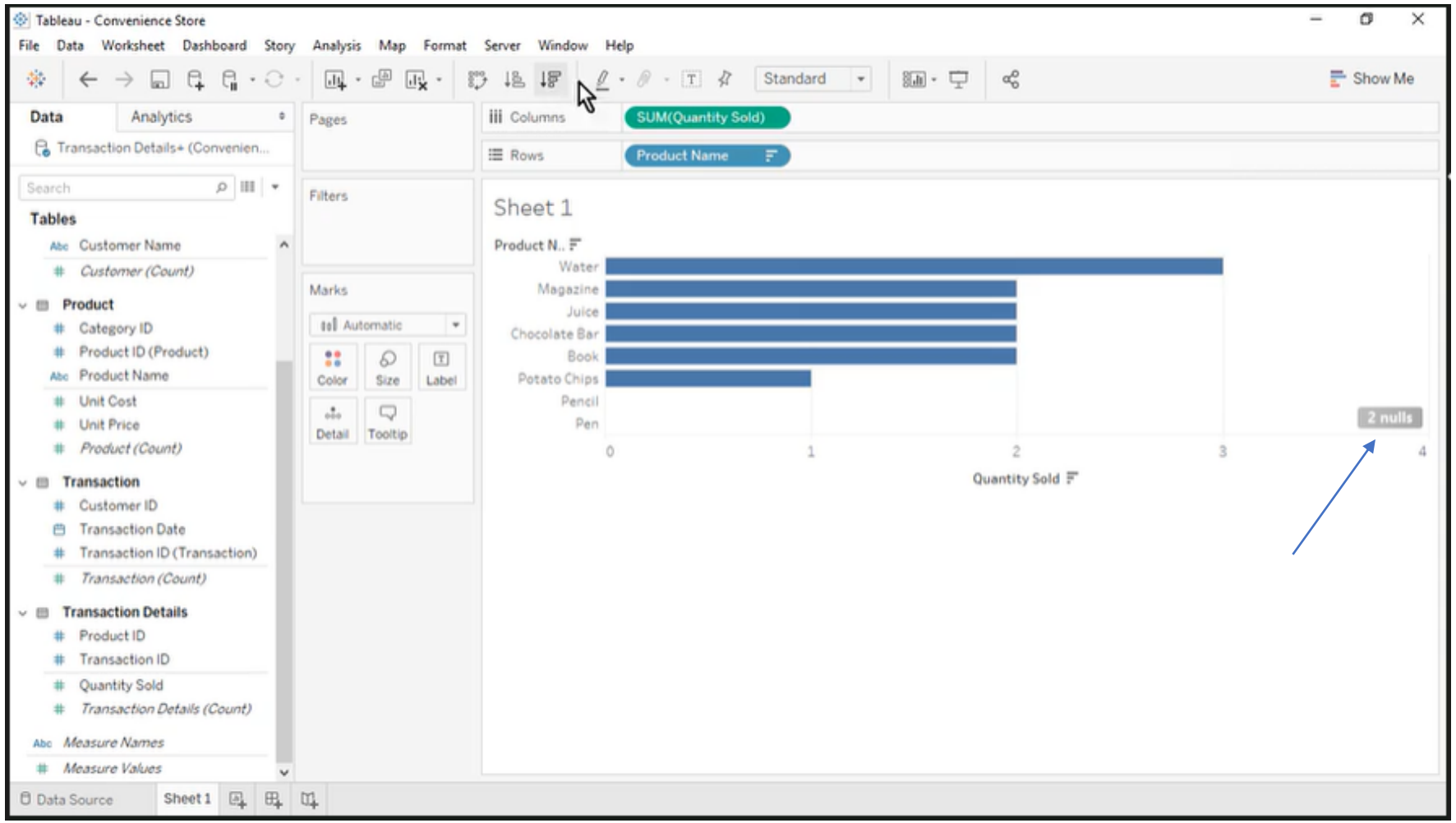
Category Table

Category ID	Category Name
1	Beverage
2	Reading Material
3	Snack
4	Stationery

Drag the Convenience store

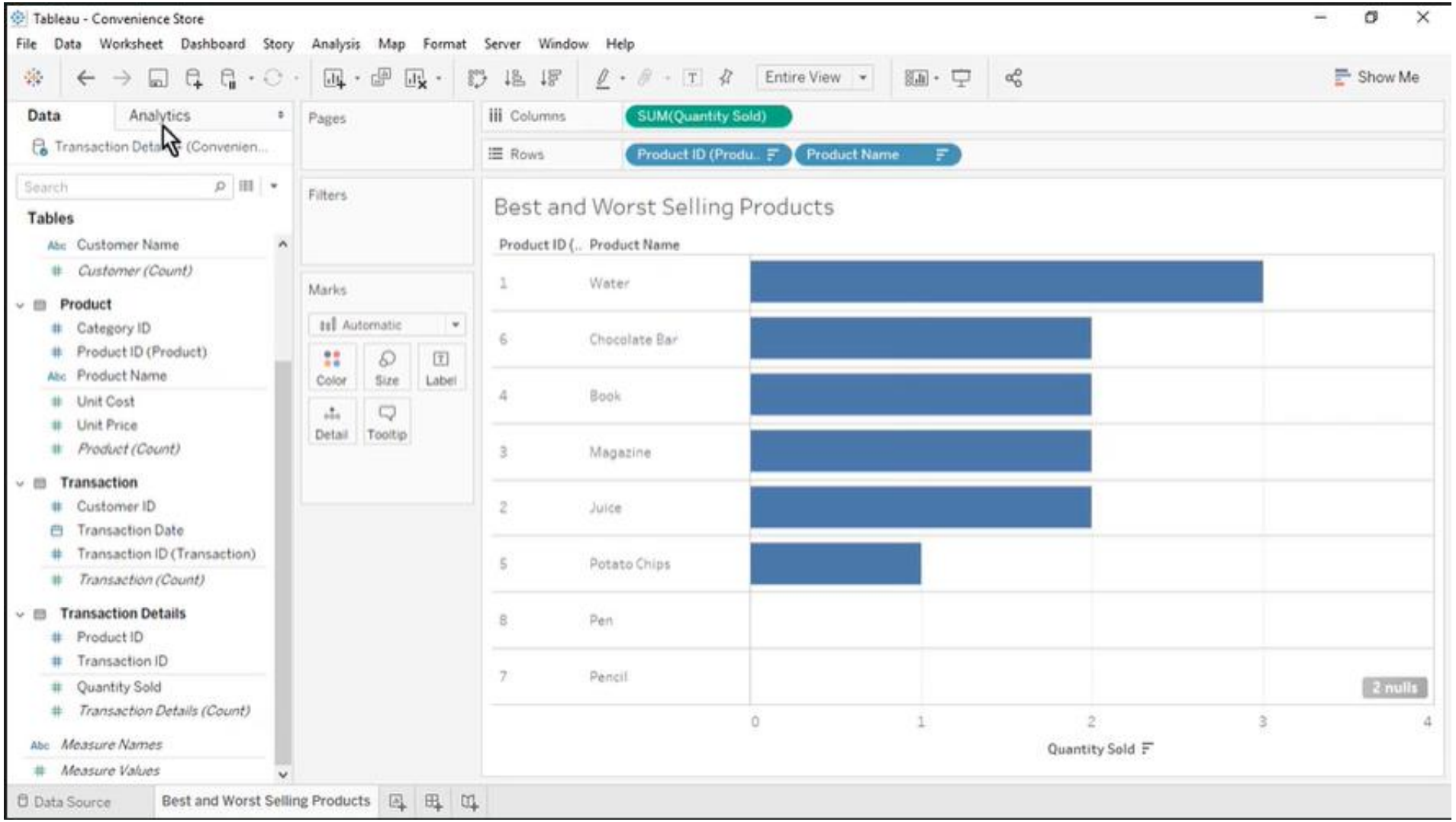


Q1. What are our best and worst selling products? (Display Product Id also)



- The best selling product is water and worst selling product is pencil and pen.
- If you want to see only the products that are sold click on 2 nulls. A filter data will appear.
- Now we need to have productid. If we drag it from trans_detail table in the rows section, output is not correct so we need to drag it from product table.

Output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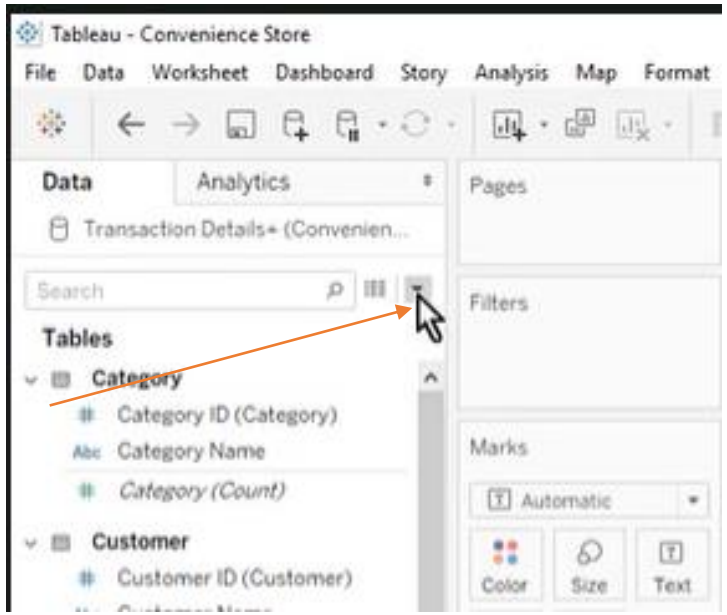
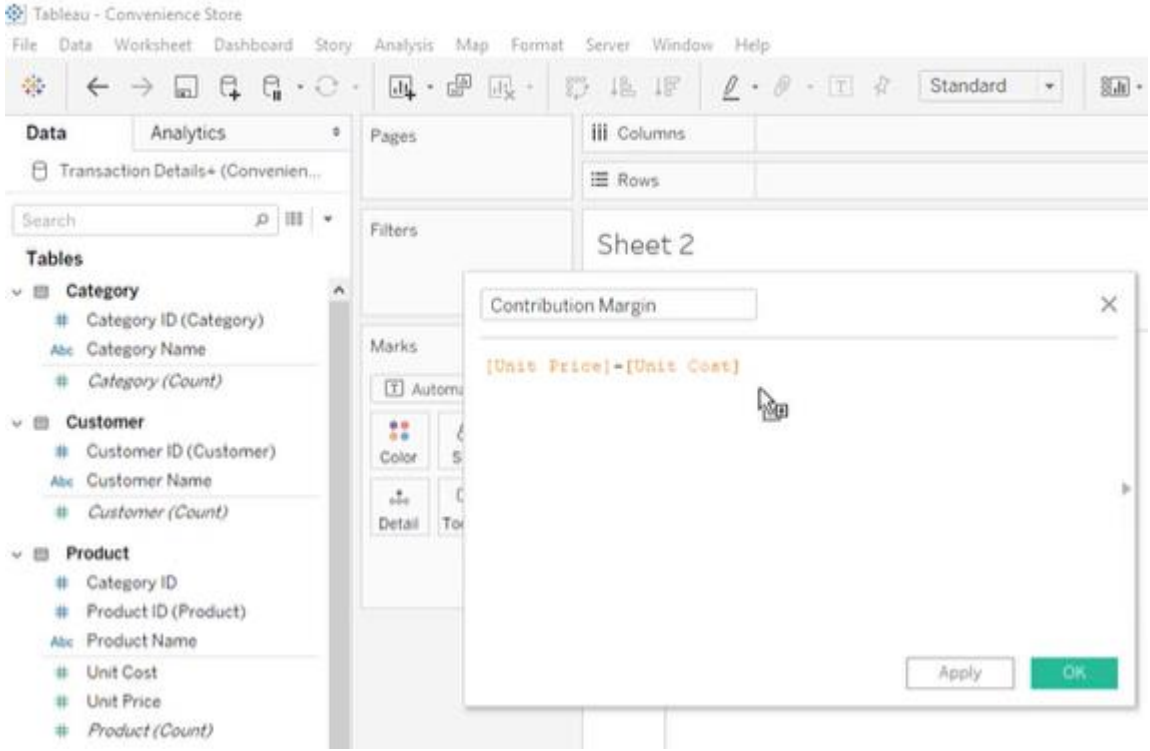
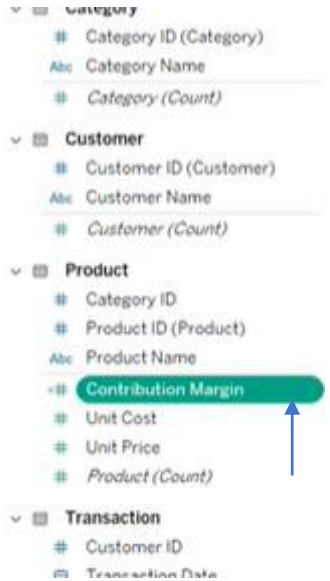
Product
Category ID
Product ID (Product)
Product Name
Unit Cost
Unit Price
Product (Count)
Transaction
Customer ID
Transaction Date
Transaction ID (Transaction)
Transaction (Count)
Transaction Details
Product ID
Transaction ID
Quantity Sold
Transaction Details (Count)
Measure Names
Measure Values
Best and Worst Selling Products
Product ID (.. Product Name
1 Water
6 Chocolate Bar
4 Book
3 Magazine
2 Juice
5 Potato Chips
8 Pen
7 Pencil
2 nulls
0 1 2 3 4
Quantity Sold
Data Source
Best and Worst Selling Products

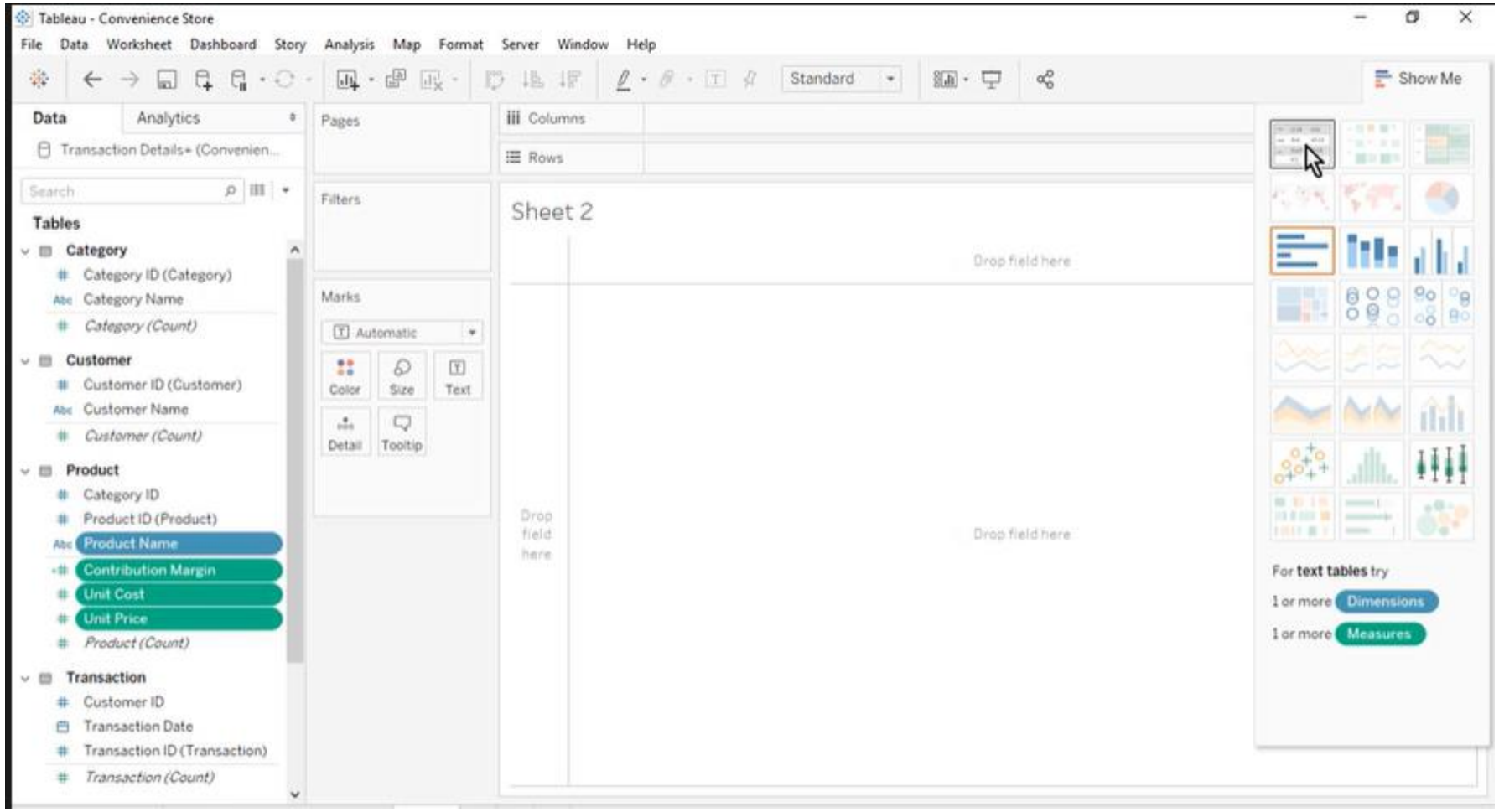
2. What was the contribution margin (CM) per product?
CM = Unit Price minus Unit Cost

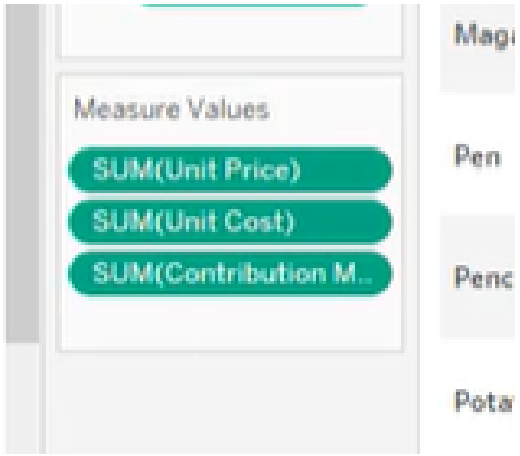






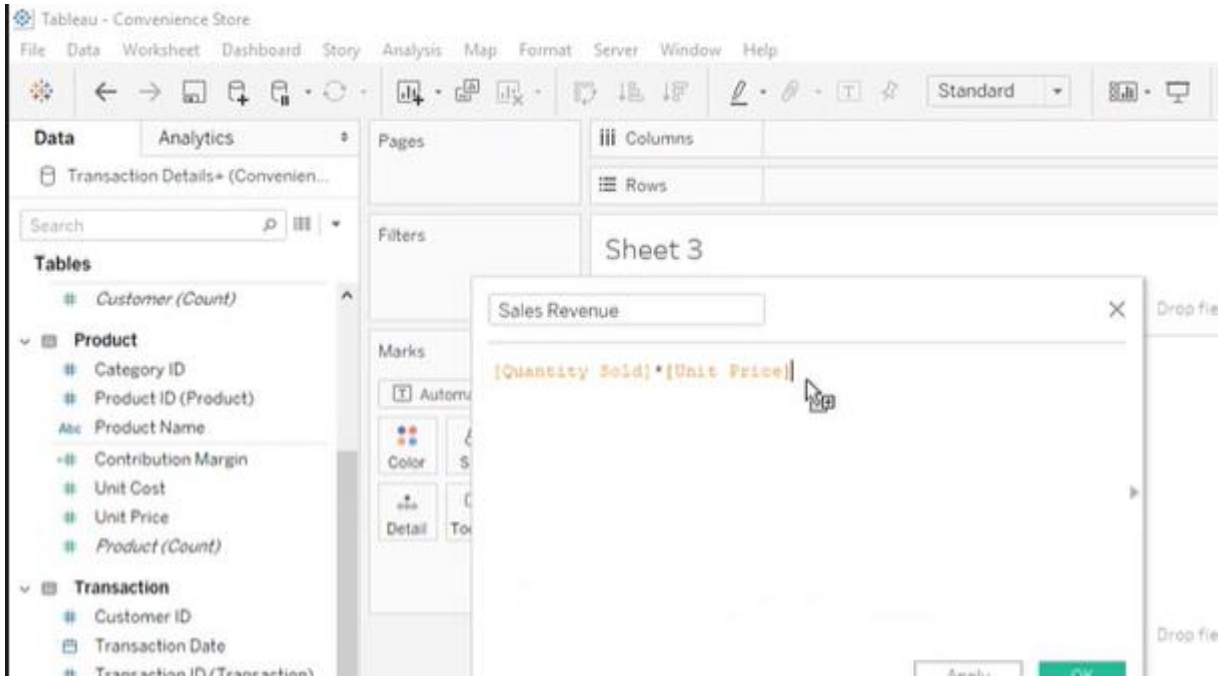
- Create a calculated field by clicking calculated column
- Give a name as contribution price. Drag unit price – and then drag unit cost. Press OK.
- You will notice that contribution margin appears in Product table
- Set the currency(standard) by clicking on the →Default properties → number format → Currency standard → OK

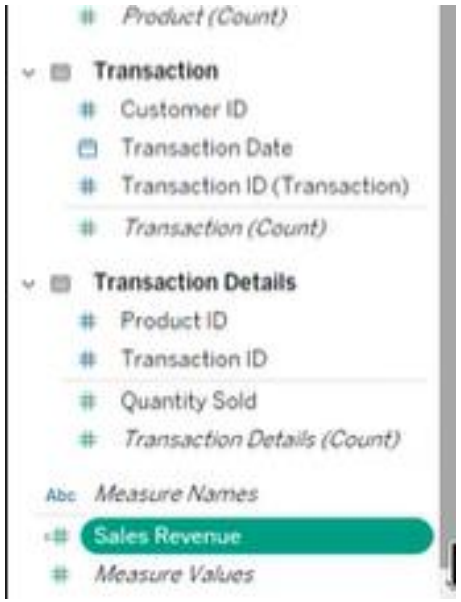




- Lets create a Text table
- Hold the ctrl key and select the options and select show me and select the text table
- Rearrange the columns as Unit cost, unit price and contribution margin
- The output can be checked

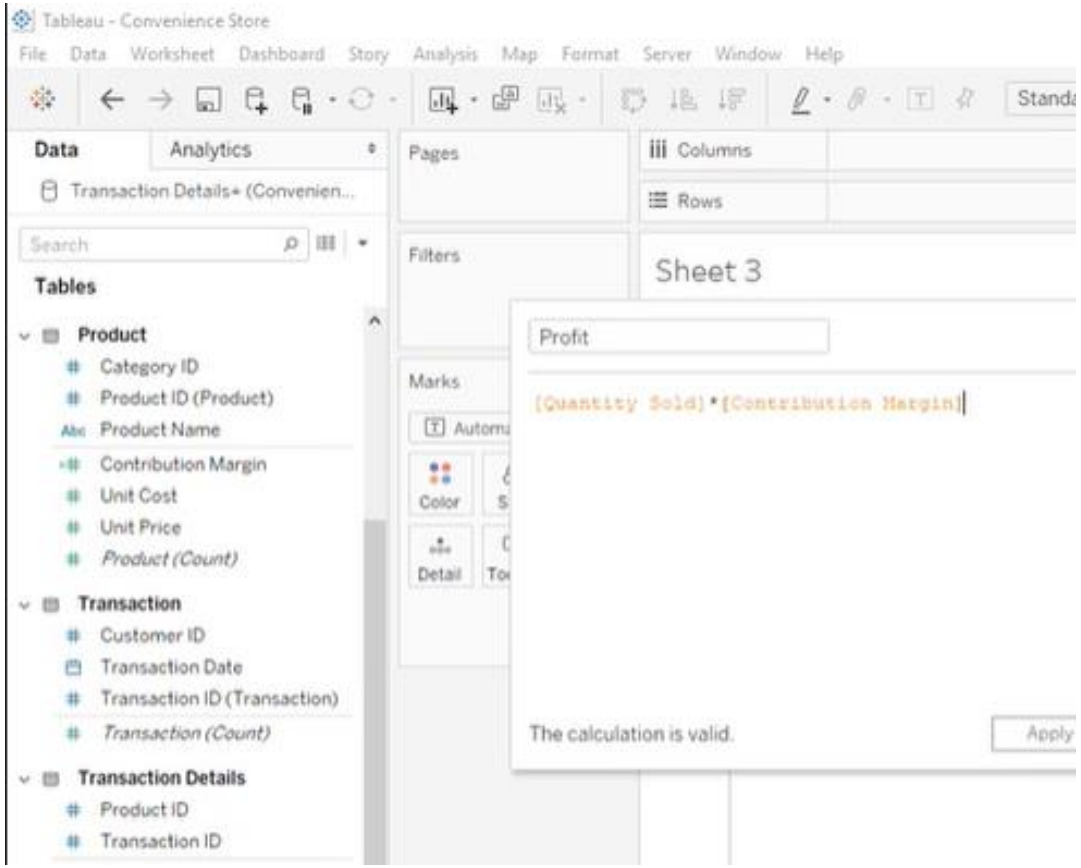
3. What were the sales revenue, profit, and profit margin per category and product?

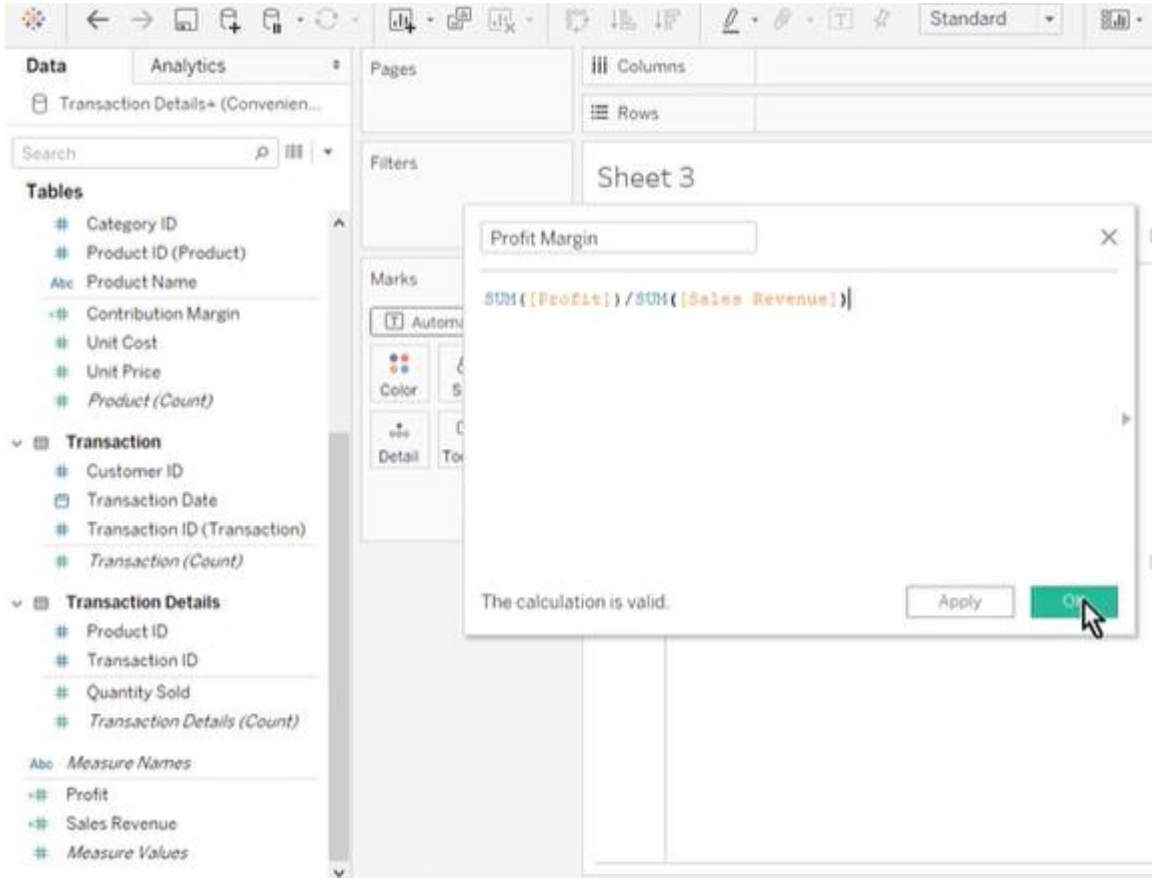




- We need to create 3 calculated fields:

1. Sales Revenue= Qty sold*Unit Price
2. Sales revenue will be created in separate tab not in the respective table as it is a value generated from two different tables.
3. Set the currency(standard)





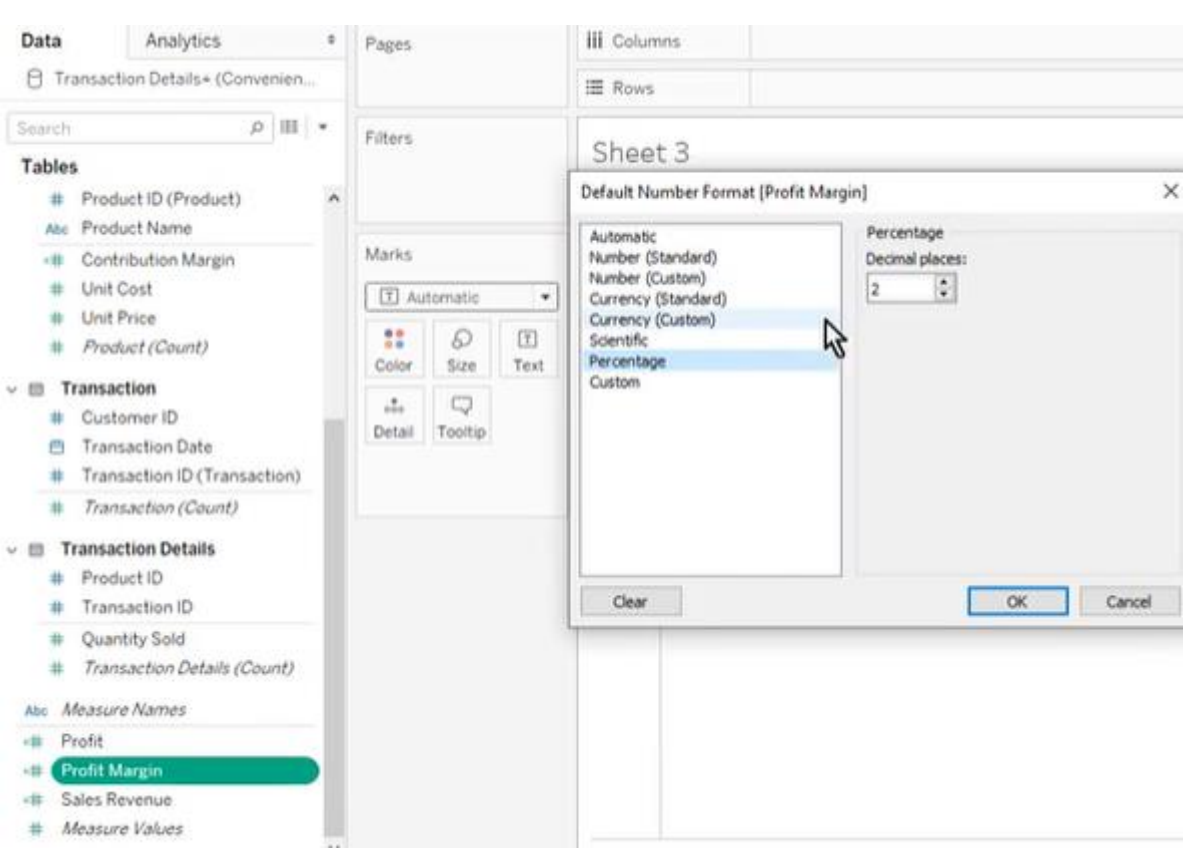
- We need to create 3 calculated fields:

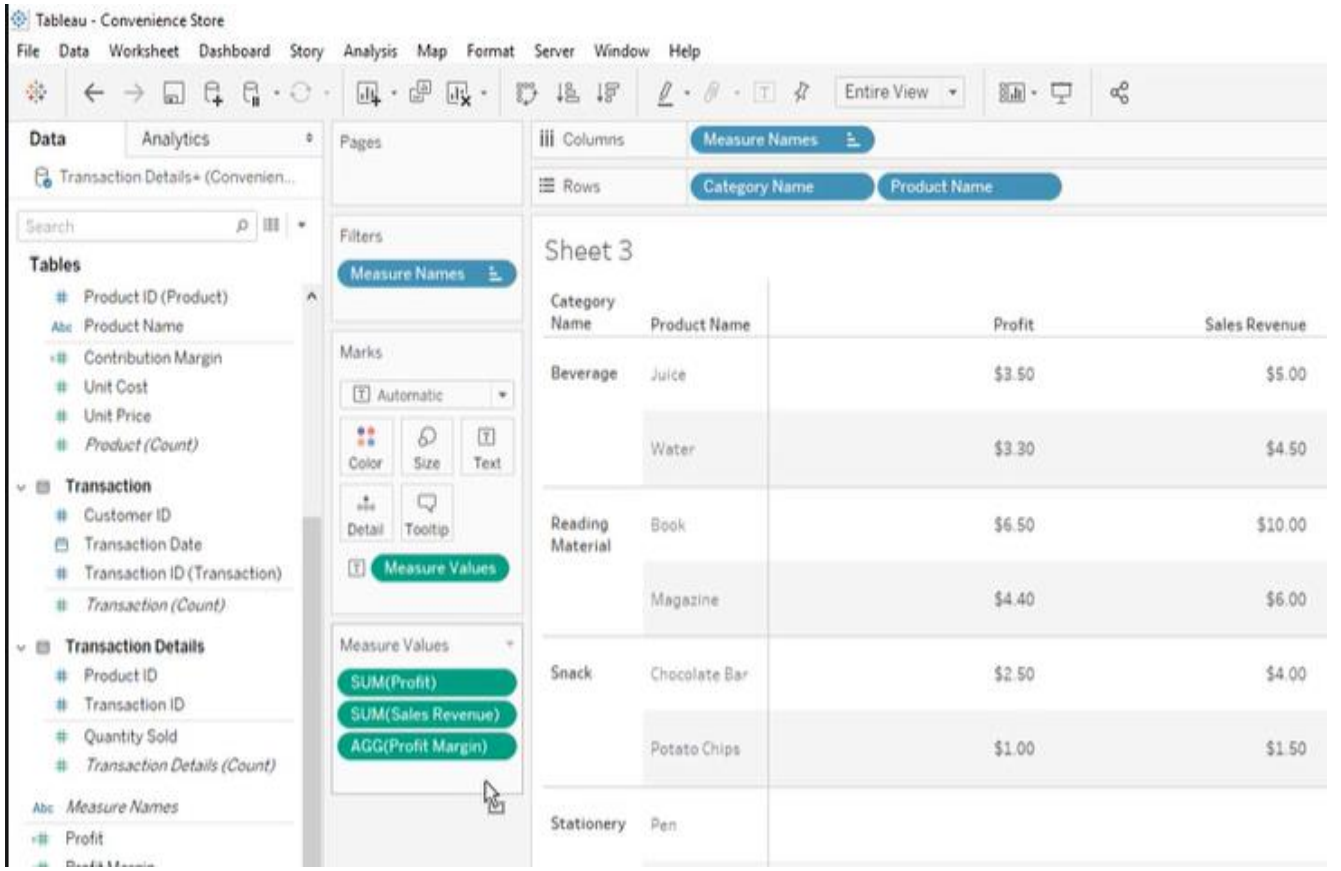
1. Now create the second calculated value:

Profit = QtySold*Contributional Margin

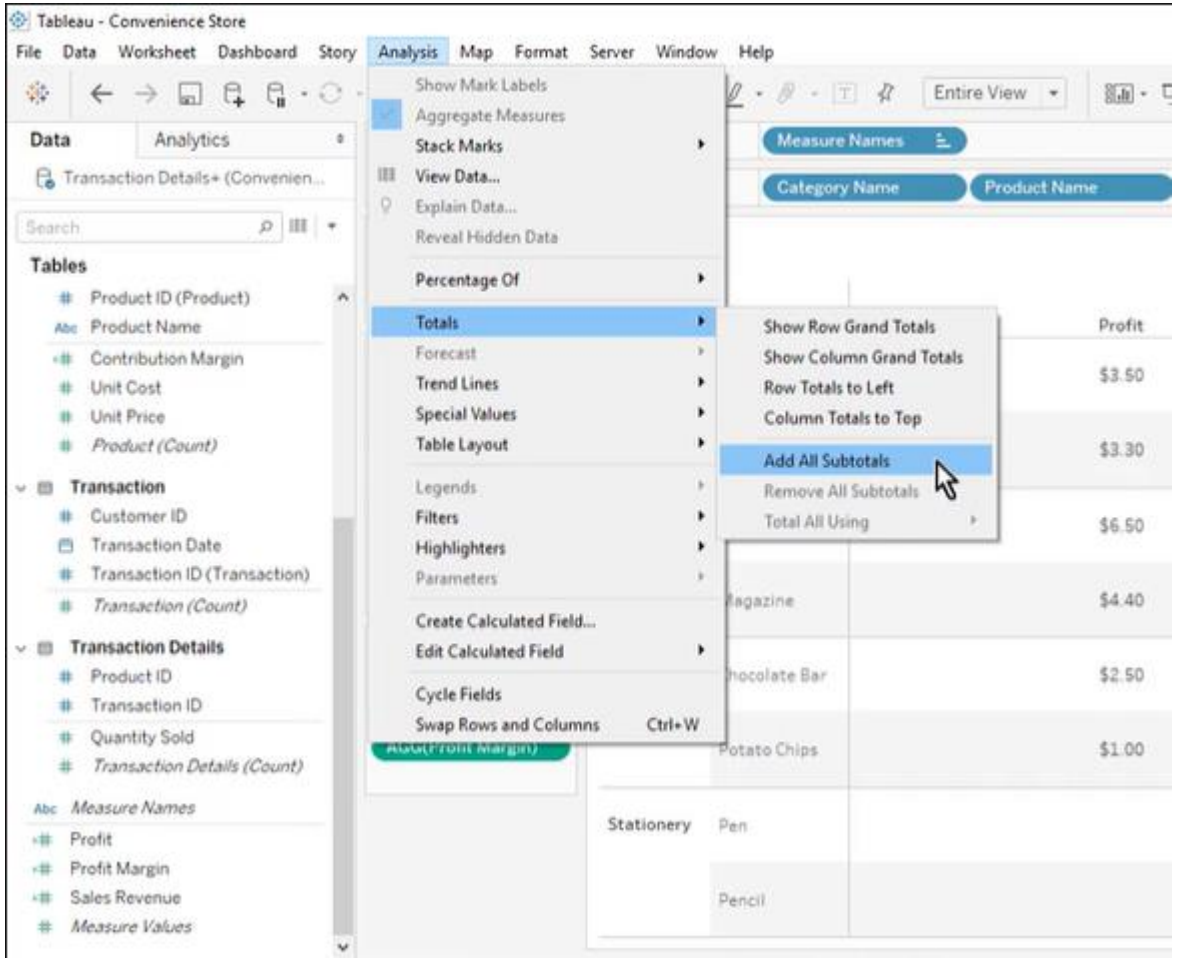
2. Profit will be created. Set the currency(standard)

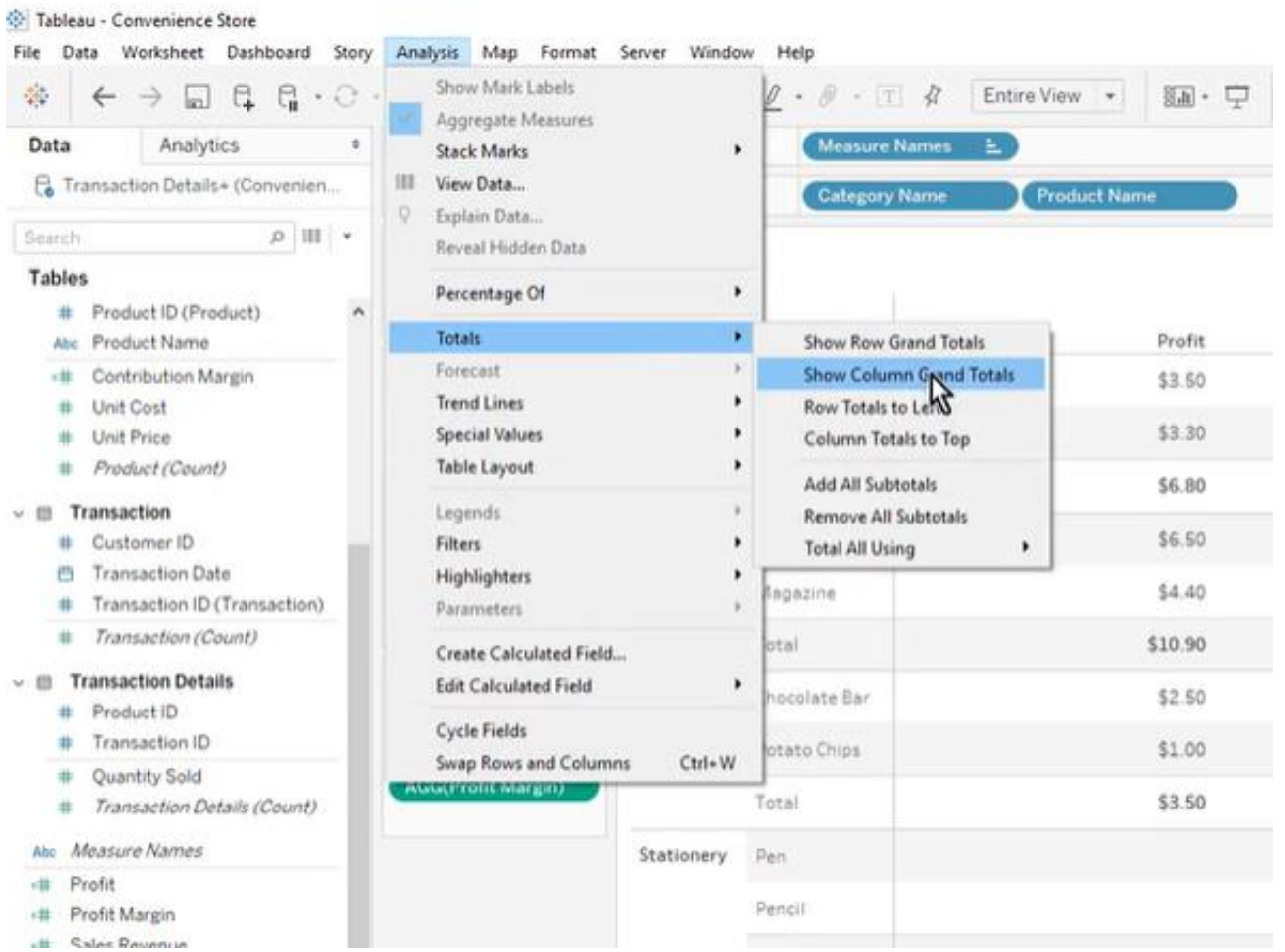
3. Now create the third calculated column: Profit margin= sum(profit)/sum(sales_reve)





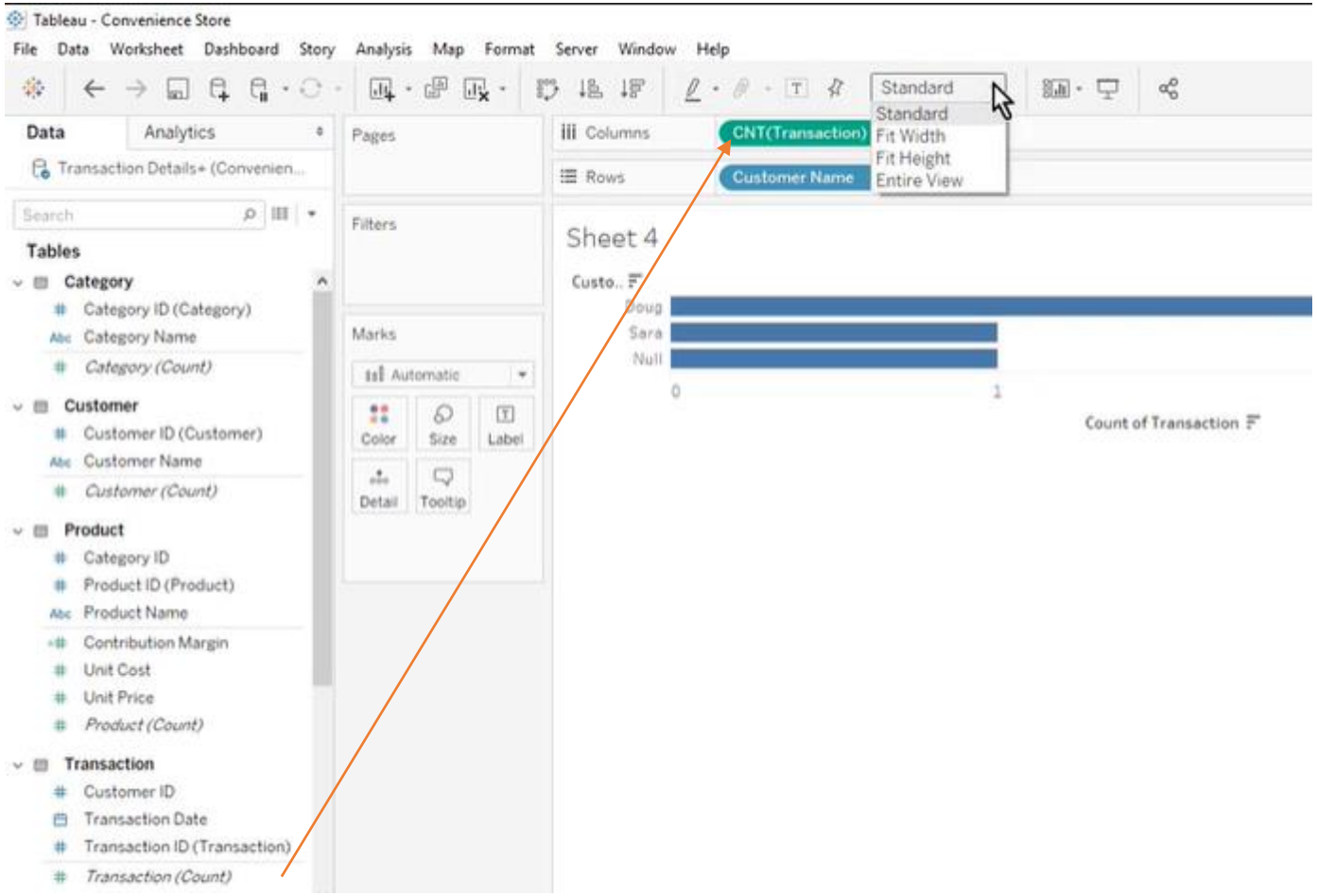
- Set the default format of profit margin, i.e. percentage to 1 decimal place
- Now press ctrl key and select Category name, product name, profit, profit margin and sales revenue.
- Click show me and select text table.
- Rearrange the measure values.





- To display the subtotal, click analysis->totals->add all subtotals
- We can display the grand total

4. Who were our most frequent customers?



- Select Customer name, cnt(transact) which is automatically generated
- Sort it in descending order.

5. Who were our most profitable customers?

Category Table

Category ID	Category Name
1	Beverage
2	Reading Material
3	Snack
4	Stationery

Customer Table

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Transaction Table

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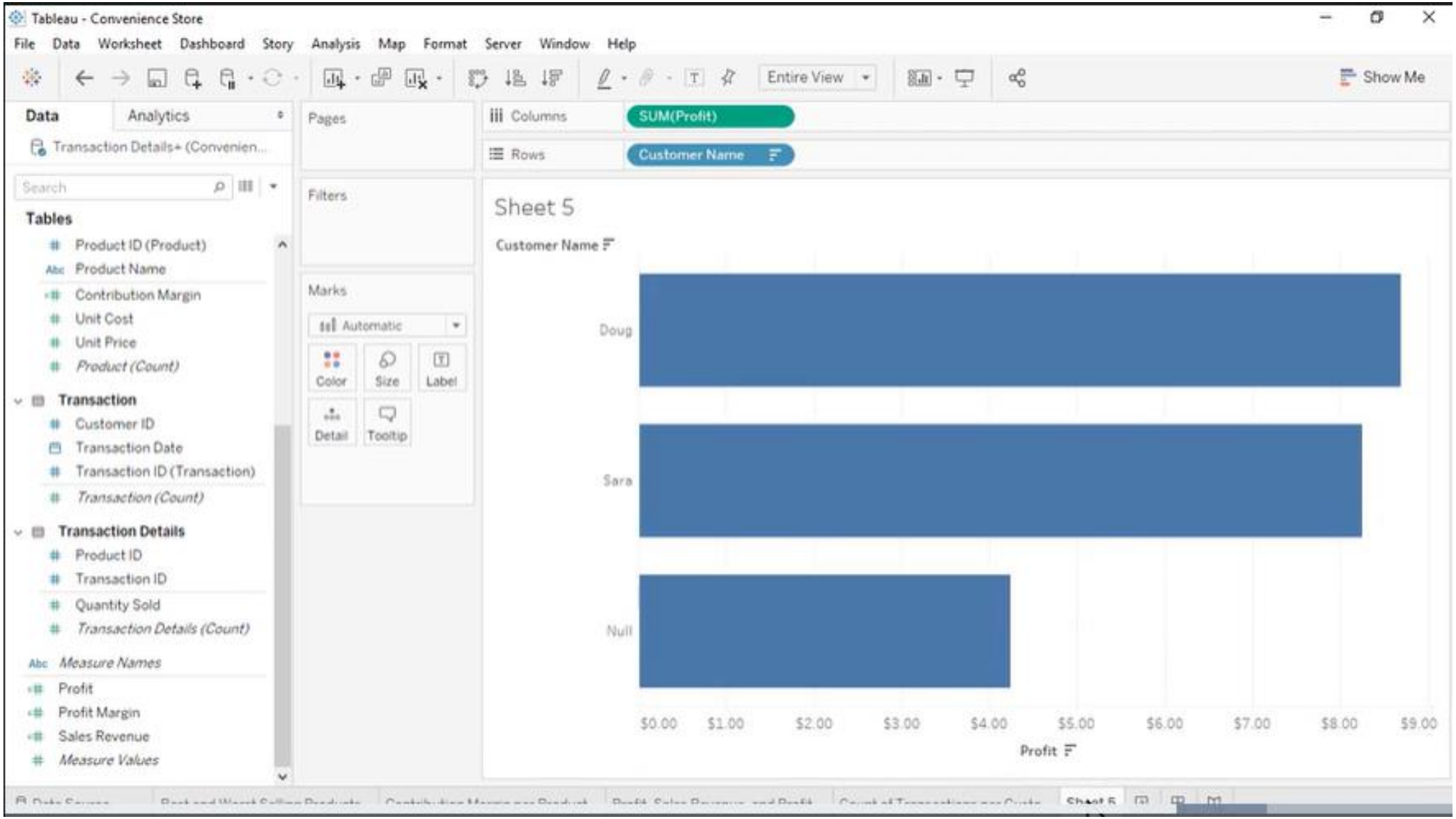
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Product ID (Product)
Product Name
Contribution Margin
Unit Cost
Unit Price
Product (Count)
Transaction
Customer ID
Transaction Date
Transaction ID (Transaction)
Transaction (Count)
Transaction Details
Product ID
Transaction ID
Quantity Sold
Transaction Details (Count)
Measure Names
Profit
Profit Margin
Sales Revenue
Measure Values
Pages
Filters
Marks
Automatic
Color
Size
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Detail
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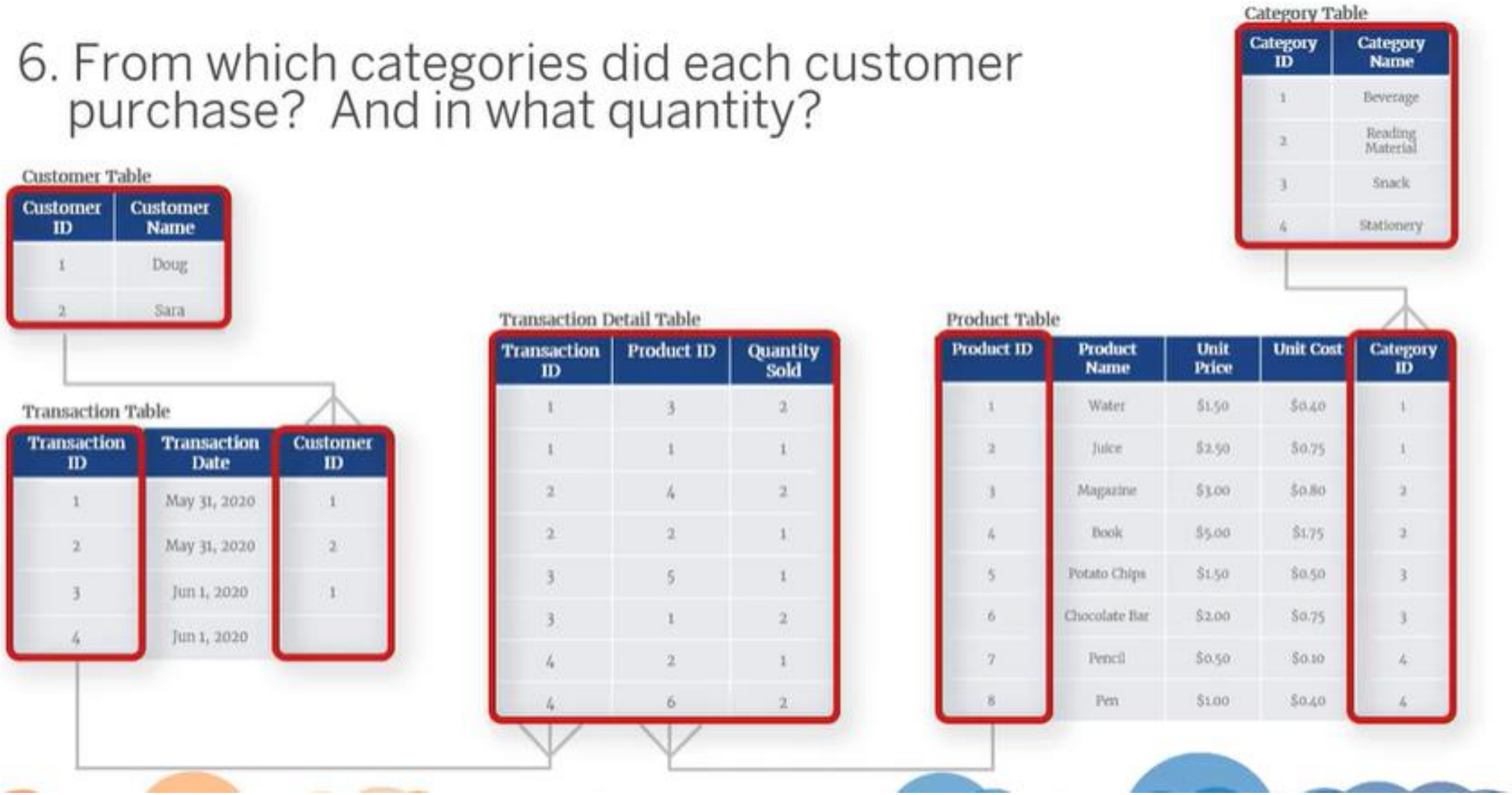
Columns
SUM(Profit)
Rows
Customer Name
Sheet 5
Customer Name
Doug
Sara
Null
$0.00
$1.00
$2.00
$3.00
$4.00
$5.00
$6.00
$7.00
$8.00
$9.00
Profit

6. From which categories did each customer purchase? And in what quantity?



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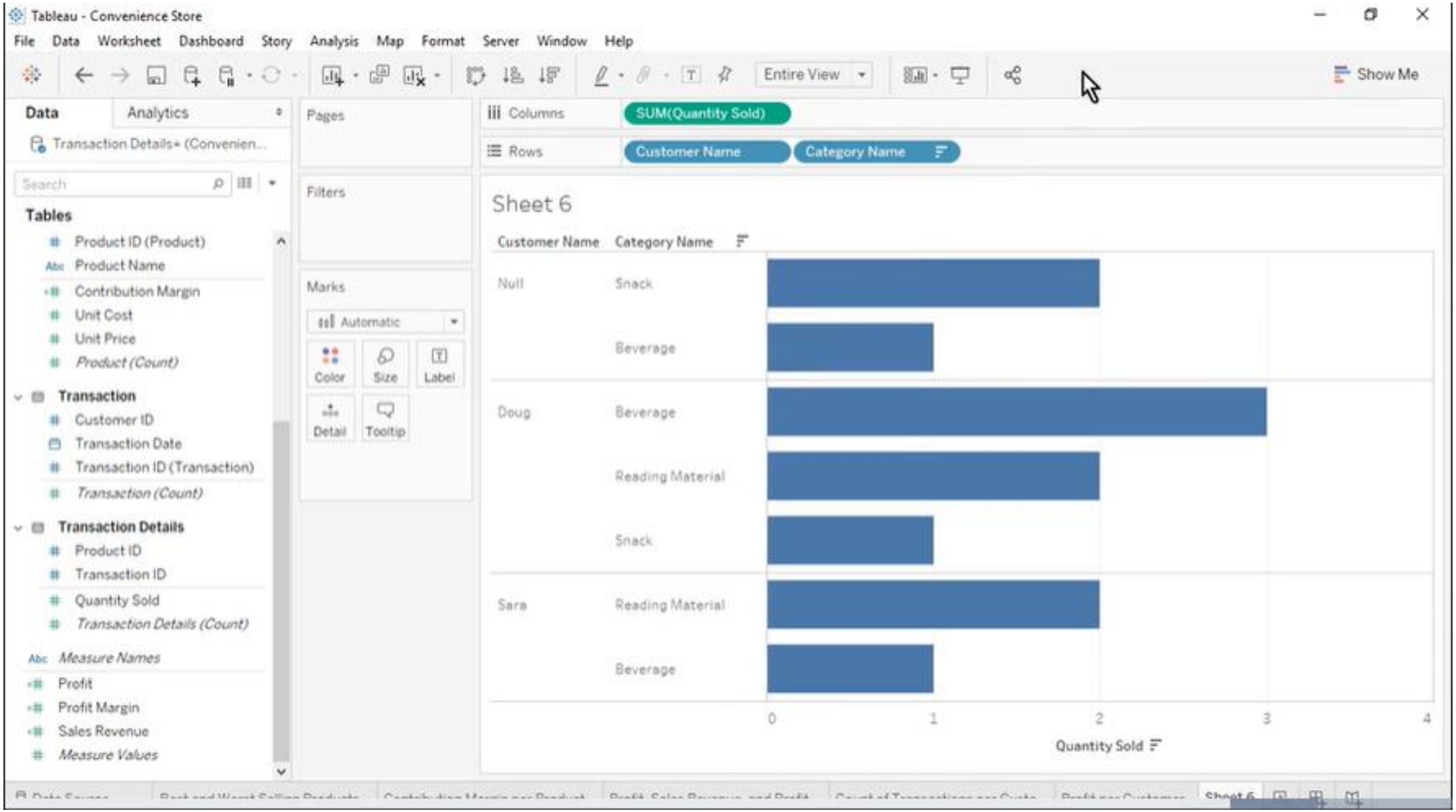
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Columns
SUM(Quantity Sold)
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Customer Name
Category Name
Sheet 6
Customer Name
Category Name
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Snack
Beverage
Doug
Beverage
Reading Material
Snack
Sara
Reading Material
Beverage
0
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2
3
4
Quantity Sold