

Data Visualization Using Tableau



Tableau Wizardry with Calculated Fields and Table Calculations



Quick Recap



- Relationships offer a versatile method to merge data from various tables, facilitating dynamic analysis.
- Tableau facilitates various join types like inner, full outer, left, and right joins for data integration.
- Joins combine data from different datasets by matching records based on common fields, helping merge datasets and enable in-depth analysis.
- Data blending merges data from multiple sources, streamlining the integration process.

Engage and Think



Suppose you're managing a budget for a marketing campaign for a new product launch. You want to analyze the return on investment (ROI) for each marketing channel, such as social media ads, email campaigns, and search engine marketing.

Have you ever had to analyze the effectiveness of your marketing campaigns across different channels to see which ones are generating the most value for your budget?

What insights would you like to uncover to optimize your marketing strategy?

Learning Objectives

By the end of this lesson, you will be able to:

- 🔗 Apply arithmetic operations, logical expressions, and functions effectively to perform accurate calculations
- 🔗 Create calculated fields for common data tasks like aggregation, segmentation, and trend analysis to uncover insights
- 🔗 Utilize table calculations for enhancing interactivity and insight in dashboards





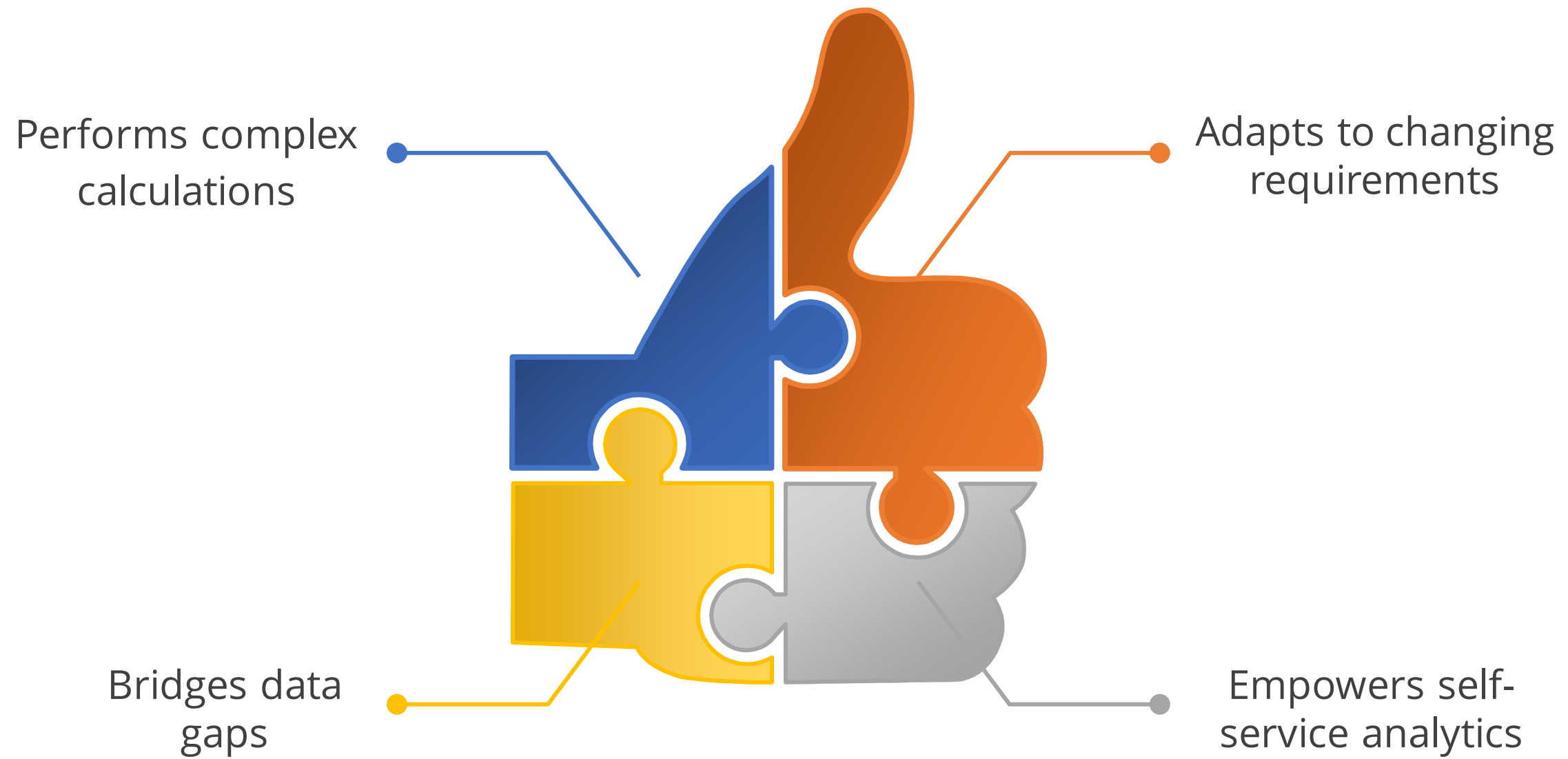
Calculated Field

Introduction to Calculated Field

A calculated field is a user-defined field that allows you to create new data points or modify existing ones based on formulas or expressions.

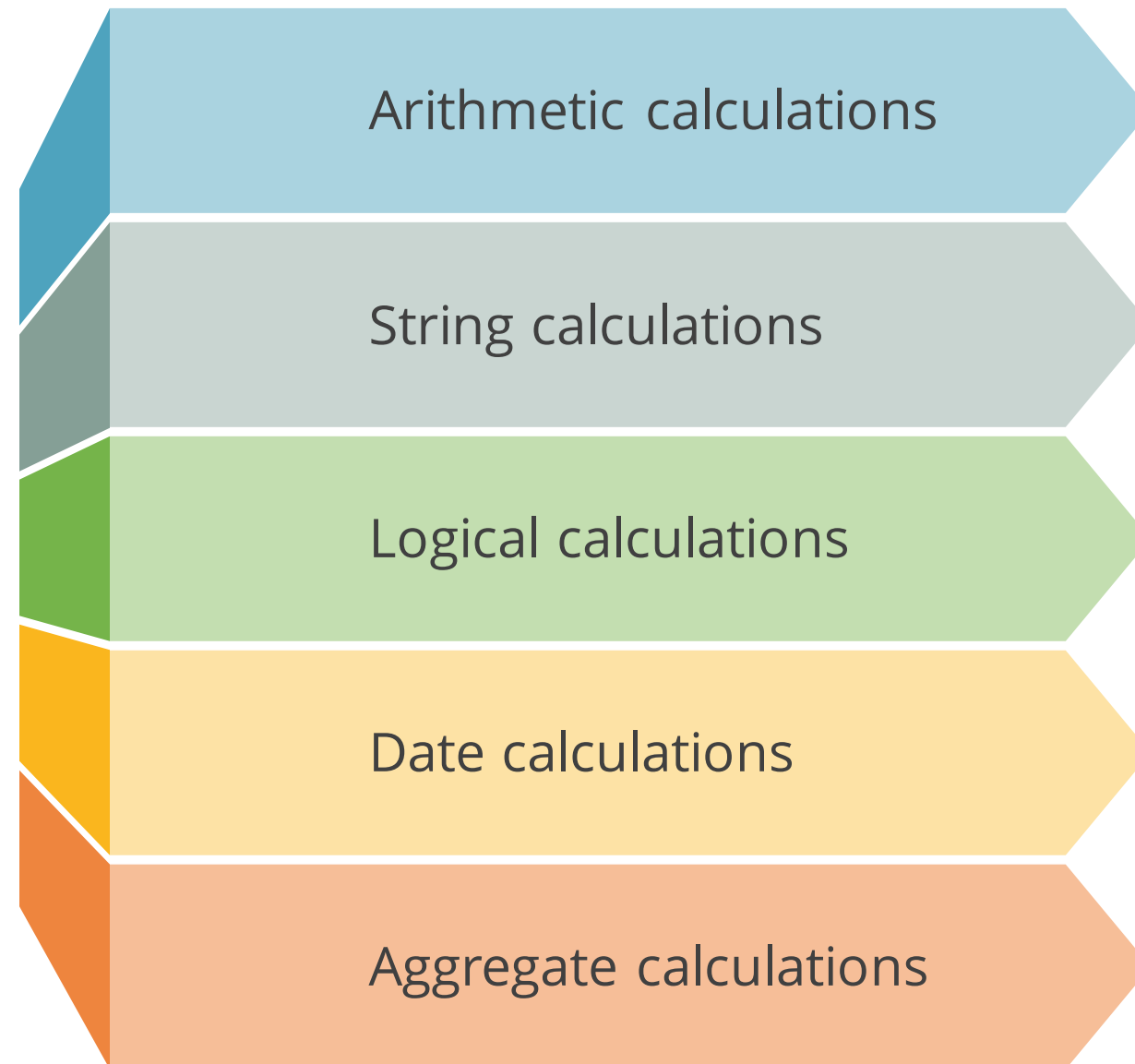


Importance of Calculated Field



Types of Calculated Fields

They are commonly used in data analysis and visualization workflows to address a wide range of analytical challenges.



Arithmetic Calculations

They are used for basic arithmetic operations like addition, subtraction, multiplication, and division.

Arithmetic calculations

To create a Calculated Field that calculates the total sales amount for each transaction:

- Create a Calculated Field called **Total Sales Amount**
- Use the formula:
[Unit Price]*[Quantity]

String Calculations

They handle text data tasks like concatenation, case conversion, and pattern matching, which are vital for data cleaning and formatting.

String calculations

To create a Calculated Field that extracts the first word from a sentence:

- Create a Calculated Field called the **First Word**
- Use the formula: **LEFT([Sentence], FIND(" ", [Sentence]) - 1)**

Logical Calculations

They are used for applying Conditional Logic, filtering data based on specific criteria, and creating Binary Flags.

Logical calculations

To create a Calculated Field that categorizes customers as either **Preferred** or **Regular** based on their total purchase amount:

- Create a Calculated Field called **Customer Category**
- Use the formula: **IF [Total Purchase Amount] >= 1000 THEN "Preferred" ELSE "Regular" END**

Date Calculations

They handle Date and Time data, crucial for time Series Analysis and Filtering.

Date calculations

To create a Calculated Field that extracts the year from a date:

- Create a Calculated Field called **Year Extract**
- Use the formula: **YEAR([Date])**

Aggregation Calculations

They compute across records or groups, enabling advanced Analytics like Segmentation and Forecasting.

Aggregate calculations

To create a Calculated Field that calculates the average sales amount per employee:

- Create a Calculated Field called **Average Sales per Employee**
- Use the formula:
AVG([Sales Amount])

Demo: Create a Calculated Field



Duration: 10 minutes

Demonstrate how to create a calculated field for the profit ratio and use the field to show the profit ratio for different segments, regions categories, and sub-categories.

DEMONSTRATION

Quick Check

You want to create a calculated field in Tableau that displays **High** for sales above \$1000 and **Low** for sales below \$1000. Which type of calculation would you use?

- A. Arithmetic calculations
- B. String calculations
- C. Logical calculations
- D. Aggregate calculations

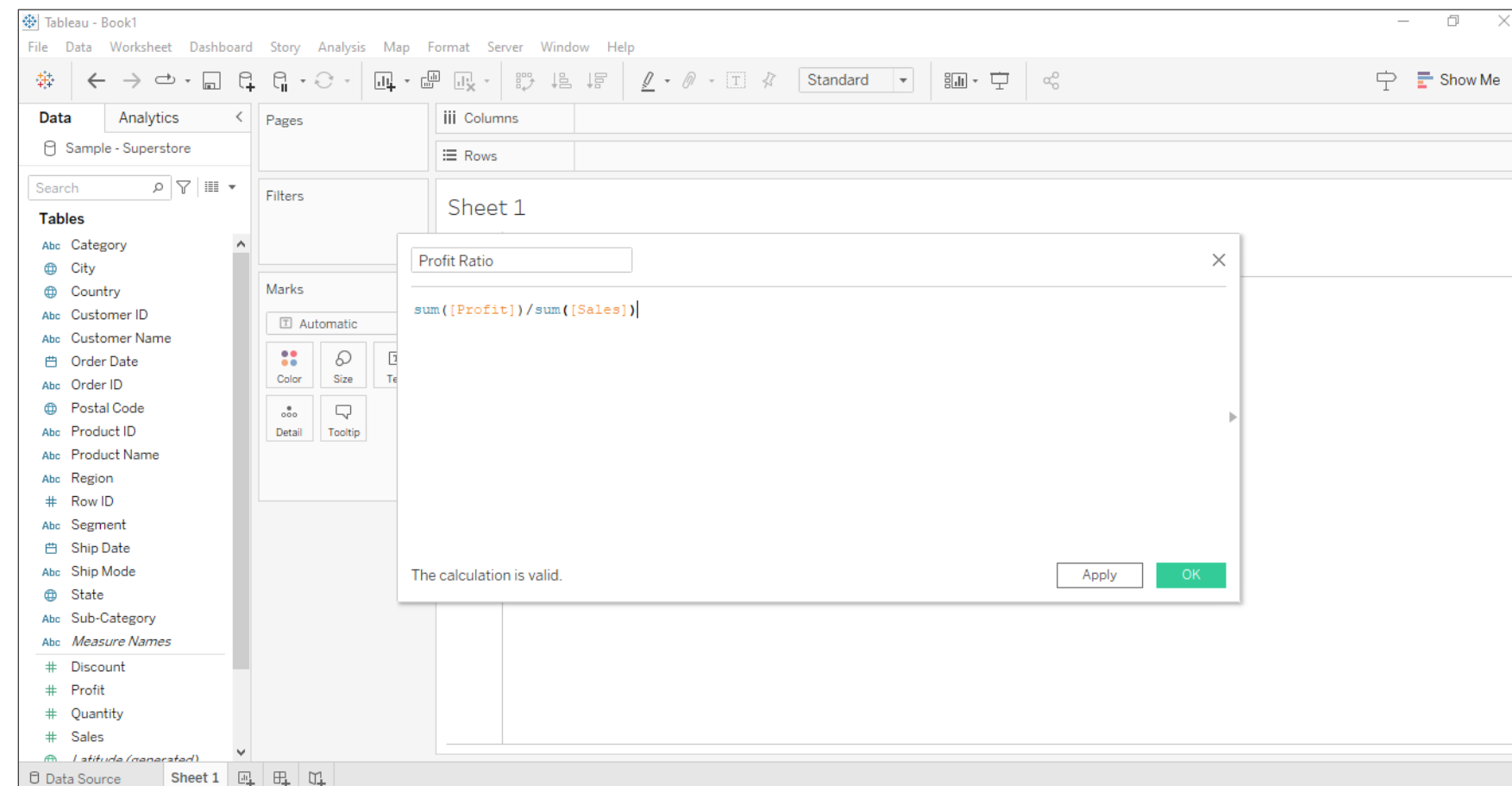




Simple Calculated Field

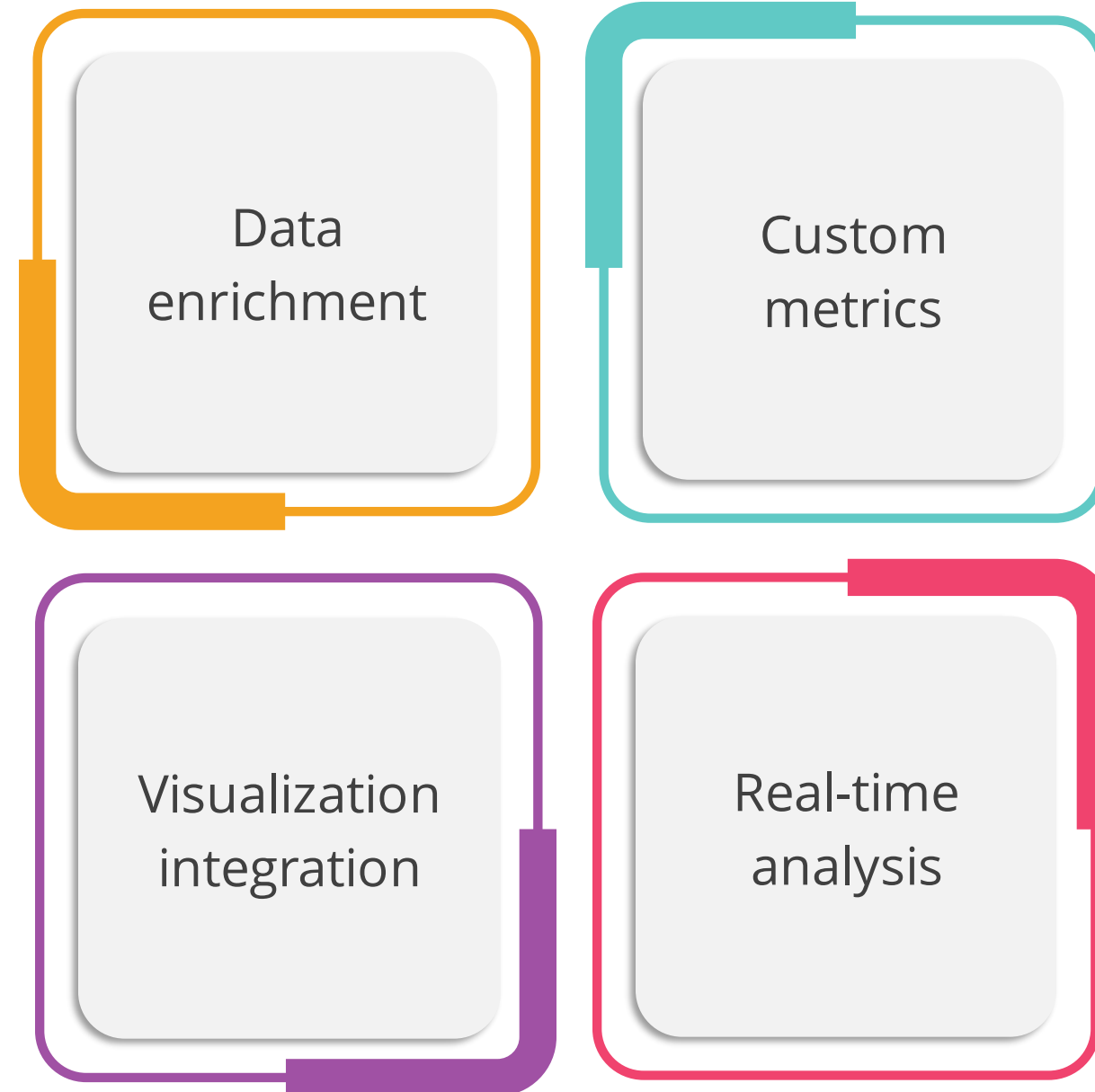
Introduction to Simple Calculated Field

A simple calculated field is a user-defined field that involves basic calculations using existing data fields or constants.



They are commonly used for performing basic data manipulations, aggregations, or deriving simple metrics in Tableau visualizations.

Importance of Simple Calculated Field



Scope and Direction for Calculated Fields

Scope specifies the level of calculation, while direction controls how the calculation interacts with other fields and dimensions.



Quick Check



In Tableau, when analyzing data across different dimensions and measures, which concept is crucial for calculating metrics at the most detailed level?

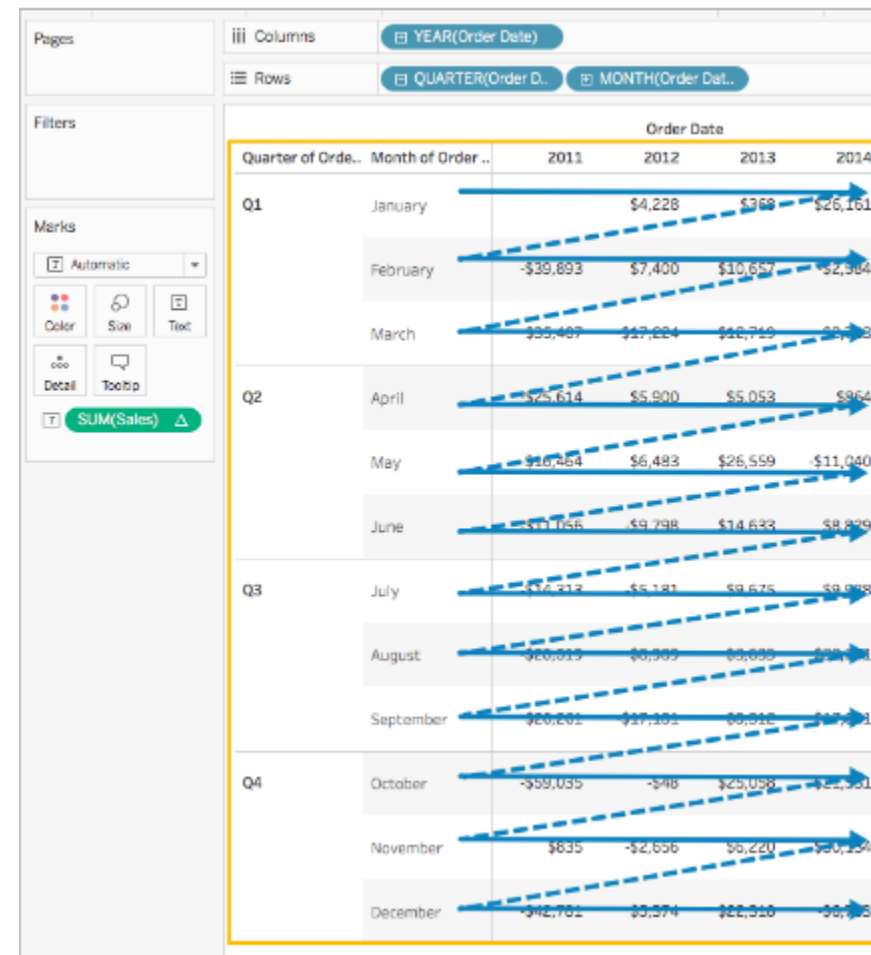
- A. Data enrichment
- B. Custom metrics
- C. Scope: table, pane, and cell
- D. Direction: across, down, across down, and down across



Table Calculations

Introduction to Table Calculations

Table calculations are pre-built calculations in Tableau that can be directly used without writing any calculations for them.



They are computations that are performed on the data displayed in a visualization, considering the current view, filters, sorting, and other applied operations.

Types of Table Calculations

Table calculations include different ways to do math and analysis in data tables:

Running total

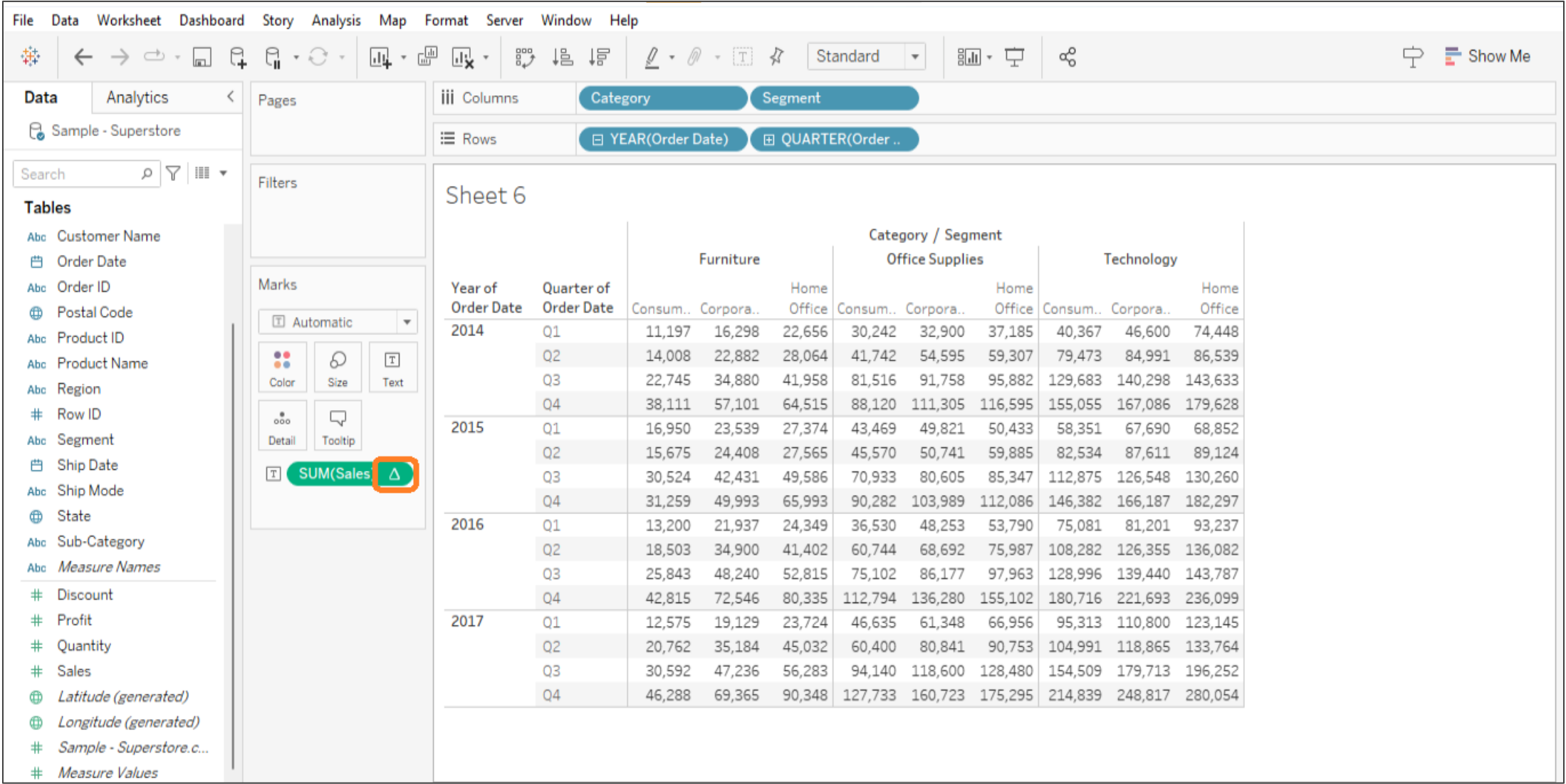
Moving average

Percent difference

Rank

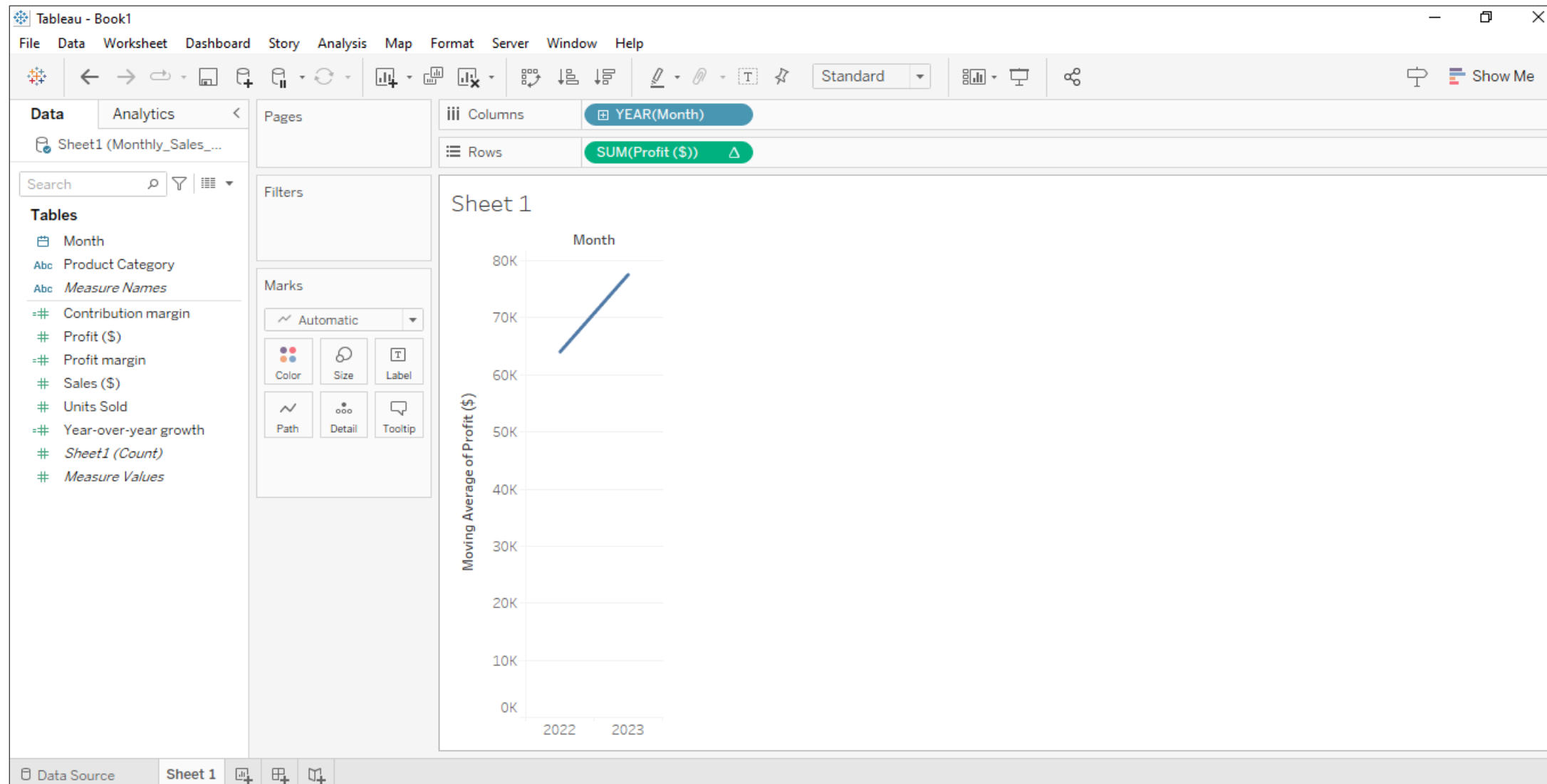
Running Total

It is a calculation that continuously accumulates the sum of a measure over a specified range of data points.



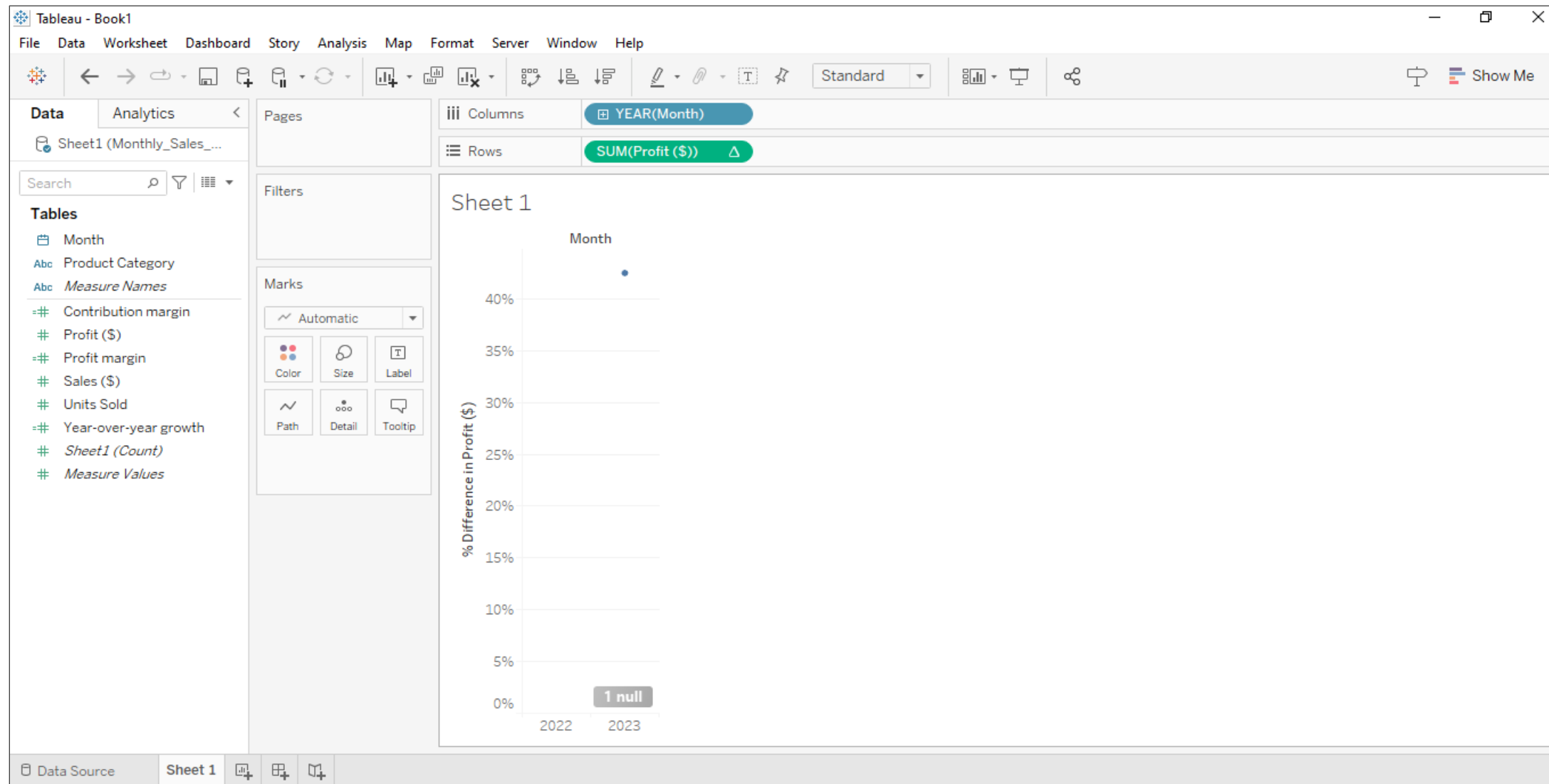
Moving Average

It is a calculation that computes the average value of a measure over a specified number of preceding data points.



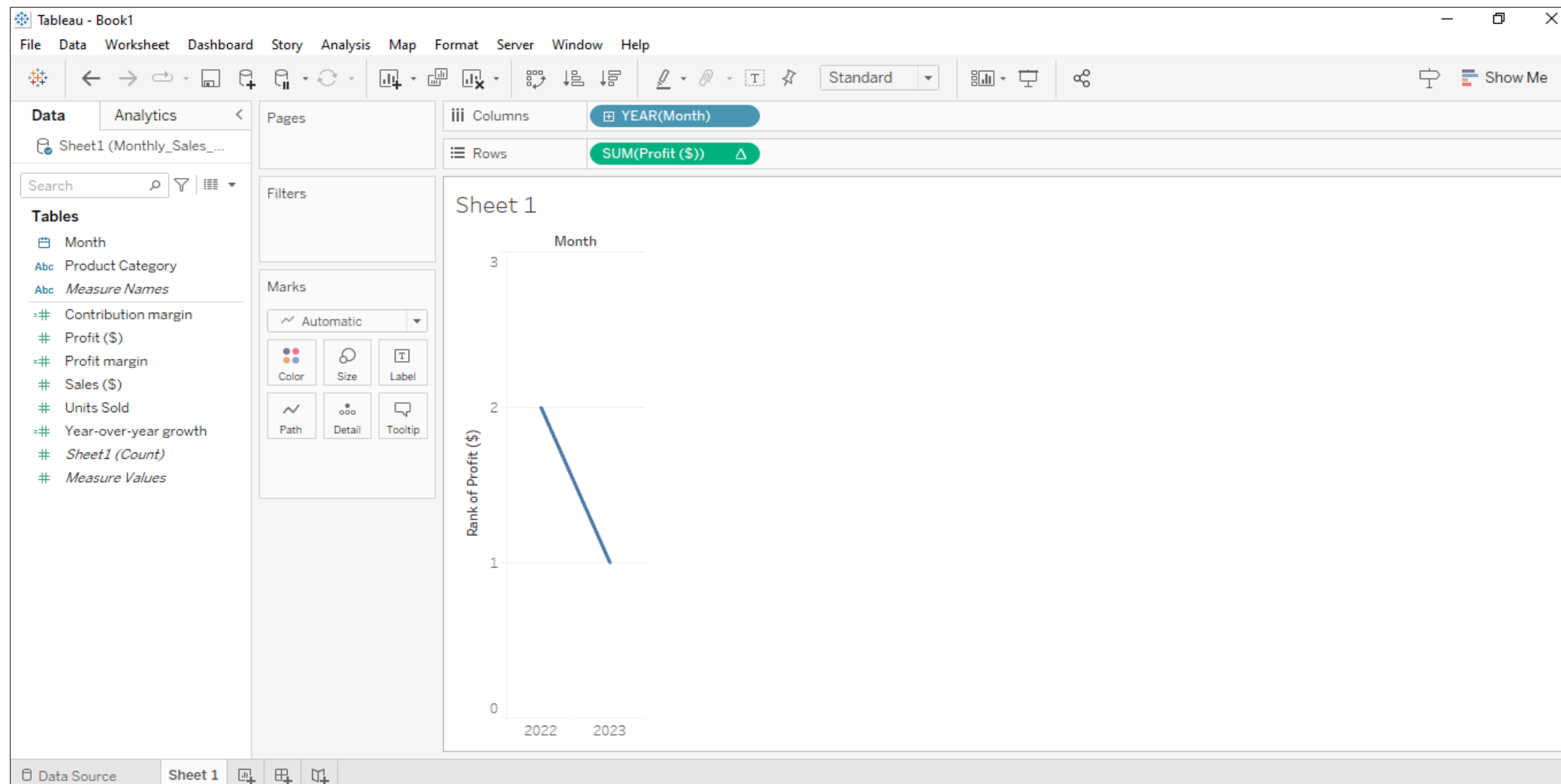
Percent Difference

It is a measure that quantifies the percentage change between two values or data points.

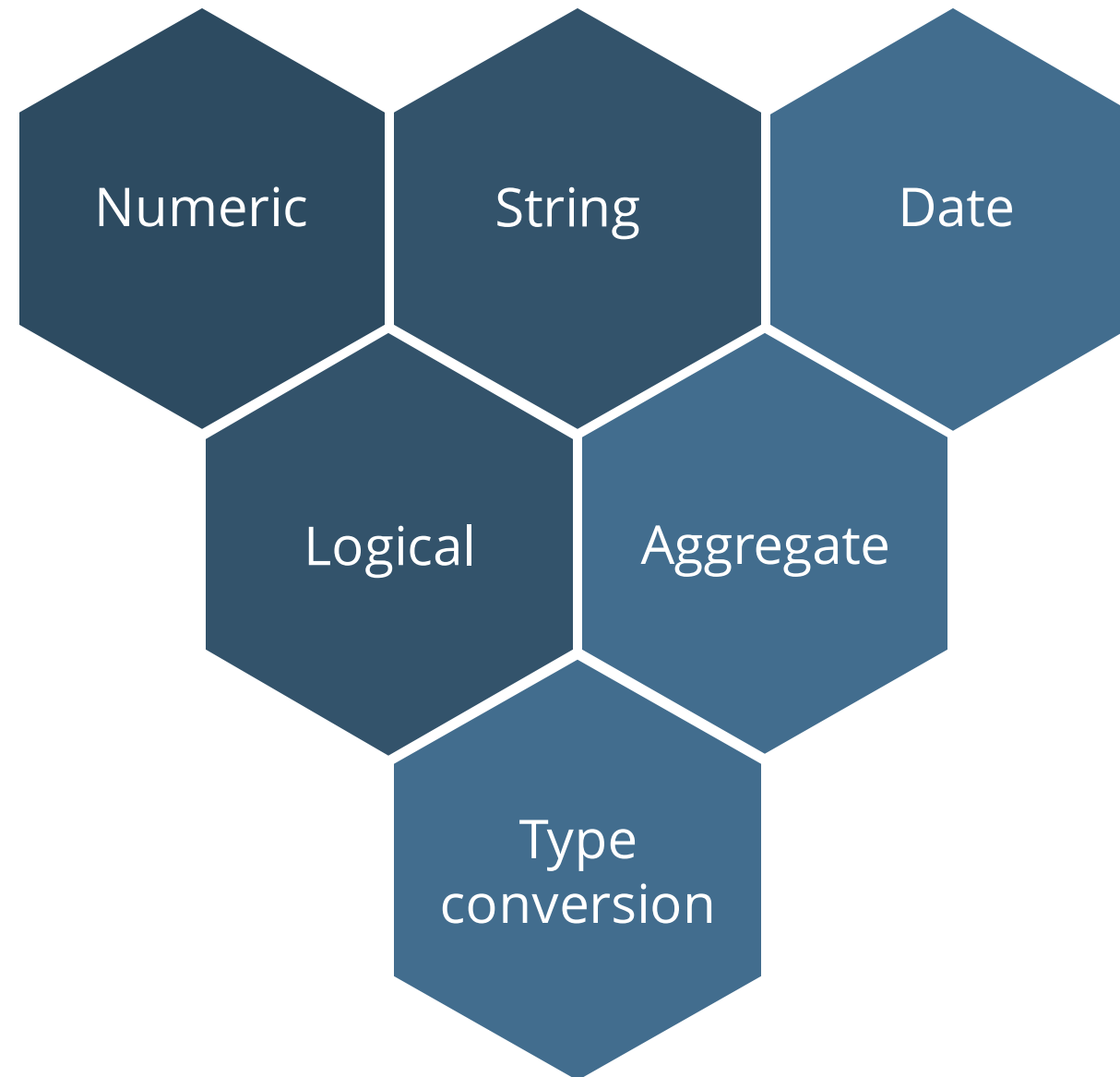


Rank

It refers to a computation that assigns a numerical ranking to each data point based on a specified measure.



Types of Functions



Numeric

It refers to a data type that includes numerical values, such as integers or decimals.

Example

Calculate the average monthly revenue for a company based on sales data.

Solution

- Create a calculated field named **Monthly Revenue** with the formula: **SUM([Sales]) / COUNTD(DATETRUNC('month', [Order Date]))**
- Drag **Order Date** to Columns and select **Month**.
- Drag **Monthly Revenue** to Rows to see the average monthly revenue.

String

It refers to a data type that represents textual data.

Example

Analyze customer feedback sentiment by counting occurrences of positive and negative words.

Solution

- Create calculated fields for positive and negative word counts using functions like **CONTAINS**, **IF**, and **SUM**.
- Aggregate the counts and visualize them using bar charts or pie charts.

Date

It refers to a field that contains date- or time-related information.

Example

Visualize monthly website traffic over the past year to identify trends and patterns.

Solution

- Drag **Date** to Columns and choose **Month** and **Year**.
- Drag the **Number of Records** (or any other appropriate measure) to Rows to see the monthly website traffic.

Logical

It refers to a field created using logical expressions or conditions.

Example

Filter data to show only customers who made a purchase and visited the website in the last month.

Solution

- Create a calculated field using logical operators like **AND**, **OR**, and **NOT** to filter data based on purchase and website visit dates.
- Apply the filter to your visualization to show relevant data.

Aggregate

It refers to a calculation that summarizes data from multiple rows into a single value.

Example

Determine the total profit margin by summing the revenue and subtracting the costs.

Solution

- Create calculated fields for revenue and cost.
- Create another calculated field for profit margin:
 $(\text{SUM}([\text{Revenue}]) - \text{SUM}([\text{Cost}])) / \text{SUM}([\text{Revenue}])$
- Drag the **Profit margin** field to your visualization to view the total profit margin.

Type Conversion

Type conversion in Tableau refers to the process of changing the data type of a field from one data type to another.

Example

Convert a text field representing product quantities into a numeric format for mathematical calculations.

Solution

- Create a calculated field to convert the text field into a numeric format using functions like **INT** or **FLOAT**.
- Use the new numeric field for calculations like summing up quantities or calculating averages.

Demo: Perform Running Total Calculations



Duration: 10 minutes

Demonstrate how to perform running total calculations to analyze the cumulative sales trend between different measures.

DEMONSTRATION

Quick Check



In Tableau, when analyzing sales data, which type of table calculation can help identify products with consistent performance over time?

- A. Running total
- B. Moving average
- C. Percent difference
- D. Rank

Guided Practice



Overview

Duration: 20 minutes

In this exercise, you will delve into the realm of calculated fields and table calculations within Tableau. You will be working with a dataset that contains information about monthly sales performance across different product categories. Through this exercise, you will learn how to create calculated fields to derive new insights and leverage table calculations to perform dynamic analysis on your data.

GUIDED PRACTICE

Key Takeaways

- A simple calculated field is often used for basic data manipulations, aggregations, or deriving metrics in Tableau visualizations.
- These are the types of calculated fields: arithmetic calculations, string calculations, logical calculations, date calculations, and aggregate calculations.
- Table calculations are pre-built calculations in Tableau and can be used without any additional writing.
- These are the types of functions in table calculations: numeric, string, date, logical, aggregate, and type conversion.



Practice Project

Analyzing Sales Performance

This exercise involves analyzing sales data from a retail company to derive insights into sales performance and trends. The objective is to utilize calculated fields and table calculations in Tableau to perform various analyses and visualization techniques.



Additional Resources

- [Tableau Community Forums](#)
- [Tableau Training and Tutorials](#)



Q&A

