



Bachelor of Technology (B.Tech)

Department of Computer Science and Engineering II year I sem- DATA VISUALIZATION - R PROGRAMMING/ POWER BI Laboratory Manual



SIDDHARTHA INSTITUTE OF TECHNOLOGY & SCIENCES

(Approved by AICTE, New Delhi & Affiliated to JNTUH,
Hyderabad) Accredited by NBA and NAAC with 'A+' Grade
Narapally, Korremula Road, Ghatkesar, Medchal- Malkajgiri (Dist)-501 301



SIDDHARTHA INSTITUTE OF TECHNOLOGY AND SCIENCES

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Narapally, Telangana – 500 088.

Vision of the Institute

To be a reputed institute in technical education towards research, industrial and societal needs.

Mission of the Institute

Mission	Statement
IM₁	Provide state-of-the-art infrastructure, review, innovative and experiment teaching –learning methodologies.
IM₂	Promote training, research and consultancy through an integrated institute industry symbiosis
IM₃	Involve in activities to groom professional, ethical values and social responsibility



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Department of Computer Science and Engineering

Vision of the Department

To be a recognized center of Computer Science education with values, and quality research

Mission of the Department

Mission	Statement
DM₁	Impart high quality professional training with an emphasis on basic principles of Computer Science and allied Engineering
DM₂	Imbibe social awareness and responsibility to serve the society
DM₃	Provide academic facilities, organize collaborated activities to enable overall development of stakeholders



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Department of Computer Science and Engineering

Program Educational Objectives (PEOs)

PEO's	Statement
PEO1	Graduates will be able to solve Computer Science and allied Engineering problems, develop proficiency in computational tools.
PEO2	Graduates will be able to communicate and work efficiently in Multidisciplinary teams with a sense of professional and social responsibility.
PEO3	Graduates will be able to exhibit lifelong learning ability and pursue career as architects, software developers and entrepreneurs.



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Department of Computer Science and Engineering

Programme Outcomes

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental context, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team network: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-Long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO1	Program Applications: Able to develop programs modules for cloud based applications.
PSO2	Development Tools: Able to use tools such as Weka, Rational Rose Raspberry-Pi, Sql and advanced tools

DATA VISUALIZATION - R PROGRAMMING/ POWER BI)

B.Tech. II Year I Sem.	L T P C
	0 0 2 1

Course Objectives:

- Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
- To discern patterns and relationships in the data.
- To build Dashboard applications.
- To communicate the results clearly and concisely.
- To be able to work with different formats of data sets.

Course Outcomes:

At the end of the course a student should be able to

- Understand How to import data into Tableau.
- Understand Tableau concepts of Dimensions and Measures.
- Develop Programs and understand how to map Visual Layouts and Graphical Properties.
- Create a Dashboard that links multiple visualizations.
- Use graphical user interfaces to create Frames for providing solutions to real world problems.

Lab Problems:

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?
2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.
3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.

9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.

10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:

1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.

2. R Programming for Data Science by Roger D. Peng (References) 3. The Art of R Programming by Norman Matloff Cengage Learning India.

Aim : Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization

Solution :

What is Data?

Data refers to raw facts, statistics, or information collected or stored in a structured or unstructured form. Data can take various forms, such as text, numbers, images, videos, and more. It is the foundation of all information and knowledge and is used in various fields for analysis, decision-making, and understanding trends and patterns.

Data can be categorized into two main types:

- **Structured Data:** This type of data is organized into a specific format, such as tables or databases, and is easily searchable and analyzable. Examples include spreadsheets, relational databases, and CSV files.
- **Unstructured Data:** Unstructured data lacks a specific format and can include text documents, social media posts, images, audio recordings, and more. Analyzing unstructured data often requires advanced techniques like natural language processing and image recognition.

Where to Find Data?

You can find data from various sources, depending on your specific needs:

- **Open Data Portals:** Many governments and organizations provide free access to a wide range of data through open data portals. Examples include Data.gov (United States) and data.gov.uk (United Kingdom).
- **Data Repositories:** Academic institutions, research organizations, and data enthusiasts often share datasets on platforms like Kaggle, GitHub, and the UCI Machine Learning Repository.
- **APIs (Application Programming Interfaces):** Some websites and services offer APIs that allow you to programmatically access and retrieve data. Examples include Twitter API, Google Maps API, and financial market APIs.

- **Web Scraping:** You can extract data from websites using web scraping tools and libraries like BeautifulSoup and Scrapy. However, be mindful of the website's terms of use and legal restrictions.
- **Surveys and Surveys:** You can conduct your own surveys or collect data through questionnaires and interviews.
- **IoT Devices:** Internet of Things (IoT) devices generate vast amounts of data that can be used for various purposes.
- **Commercial Data Providers:** Some companies specialize in selling datasets for specific industries, such as market research, finance, and healthcare.

Foundations for Building Data Visualizations:

Creating effective data visualizations requires a strong foundation in several key areas:

- **Data Analysis:** Before creating visualizations, you should thoroughly analyze your data to understand its structure, relationships, and any patterns or trends. Exploratory data analysis (EDA) techniques can help with this.
- **Statistical Knowledge:** Understanding basic statistics is essential for making meaningful interpretations of data. Concepts like mean, median, standard deviation, and correlation are commonly used in data visualization.
- **Domain Knowledge:** Having knowledge of the specific domain or subject matter related to your data is crucial for creating contextually relevant visualizations. It helps you ask the right questions and provide valuable insights.
- **Visualization Tools:** Familiarize yourself with data visualization tools and libraries such as matplotlib, Seaborn, ggplot2, D3.js, and Tableau. Each tool has its strengths and can be used for different types of visualizations.
- **Design Principles:** Study design principles, including color theory, typography, and visual hierarchy, to create visually appealing and effective visualizations. Avoid common pitfalls like misleading visualizations.
- **Interactivity:** Learn how to add interactive elements to your visualizations to engage users and allow them to explore the data. This can be achieved using tools like JavaScript, Python libraries, or dedicated visualization software.

Creating Your First Visualization:

To create your first data visualization, follow these general steps:

- **Select Your Data:** Choose a dataset that aligns with your goals and interests. Ensure that the data is clean and well-structured.
- **Define Your Objective:** Clearly define what you want to communicate or explore with your visualization. Are you looking to show trends, comparisons, or distributions?
- **Choose the Right Visualization Type:** Select a visualization type that suits your data and objectives. Common types include bar charts, line charts, scatter plots, histograms, and pie charts.
- **Prepare and Transform Data:** Preprocess your data as needed. This may involve aggregating, filtering, or transforming the data to fit the chosen visualization.
- **Create the Visualization:** Use a suitable tool or library to create your visualization. Customize it with labels, colors, and other design elements.
- **Interactivity (Optional):** If appropriate, add interactive features to your visualization to allow users to interact with the data.
- **Test and Iterate:** Review your visualization for accuracy and clarity. Seek feedback from others and make improvements as necessary.
- **Publish or Share:** Once you are satisfied with your visualization, publish it on a platform, embed it in a report, or share it with your intended audience.
- **Document and Explain:** Provide context and explanations for your visualization. Clearly communicate what the viewer should take away from it.
- **Maintain and Update:** If the data changes or new insights emerge, update your visualization accordingly.

Aim:

Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.

Solution :

Getting started with Tableau software is a great way to create data visualizations quickly and efficiently. Here are the steps to get started, including connecting your data to Tableau, creating basic charts like line charts, bar charts, and treemaps, and using the Show Me panel:

1. Download and Install Tableau:

First, you'll need to download and install **Tableau Desktop** or **Tableau Public** (a free version). Follow the installation instructions provided on the Tableau website for your specific operating system.

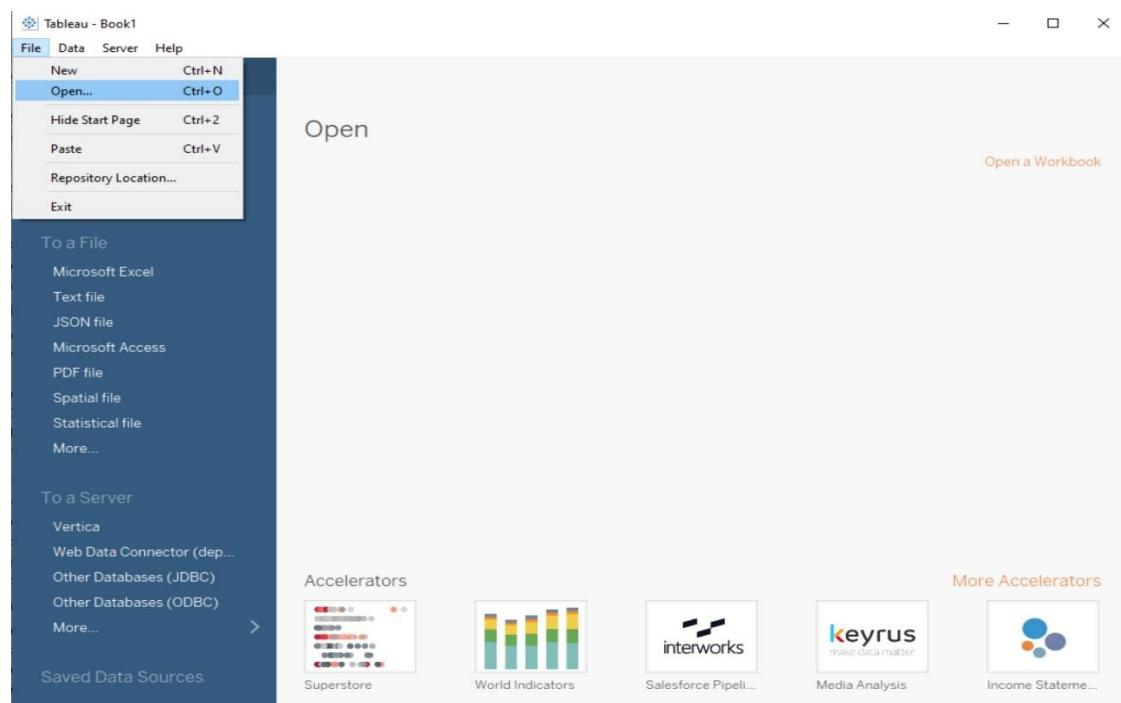
2. Prepare Your Data:

Before connecting your data to Tableau, ensure that your data is in a suitable format. Common data file formats that Tableau supports include **Excel (.xlsx)**, **CSV (.csv)**, and **text files (.txt)**. Make sure your data is organized with headers for each column.

3. Connect Your Data to Tableau:

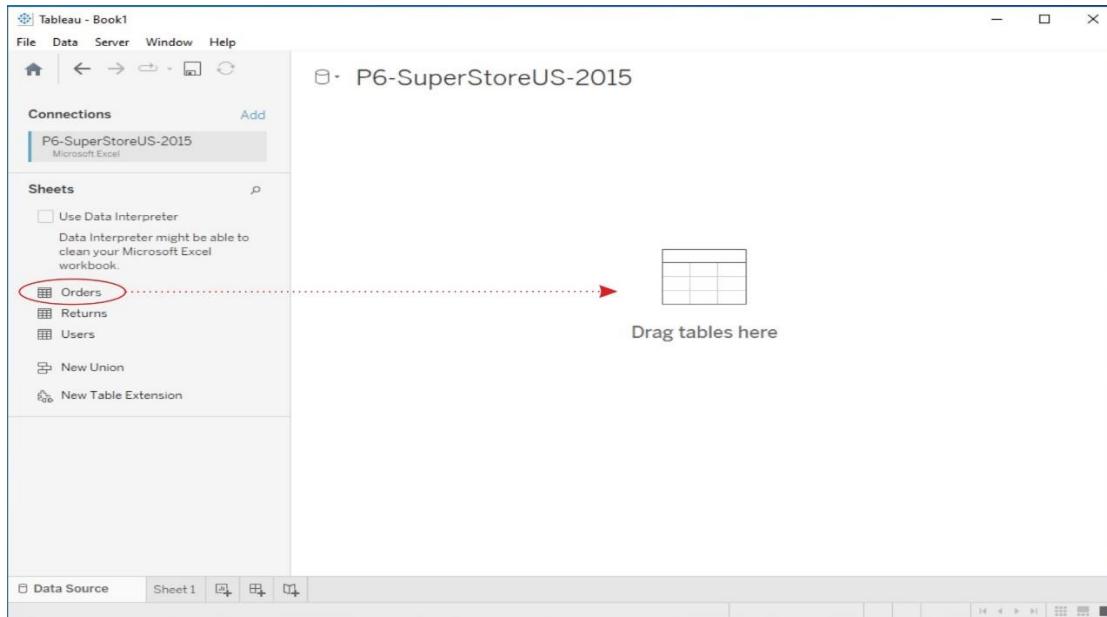
3.1 Launch **Tableau Desktop**.

3.2 Go to "File" Menu and then click on "Open".



3.3 Choose the data source type (e.g., Excel, CSV, text file) and Select the data file(**P6-SuperStoreUS-2015.xls**) and click "Open".

3.4 Drag any table(e.g. Orders) into working area.



3.5 Click on Worksheet(**Sheet1**).

The screenshot shows the Tableau Data Source pane. On the left, there's a sidebar with 'Connections' (P6-SuperStoreUS-2015, Microsoft Excel), 'Sheets' (Orders, Returns, Users, New Union, New Table Extension), and a 'Use Data Interpreter' checkbox. The main area shows a preview of the 'Orders' sheet with 25 fields and 1952 rows. A red 'click' annotation points to the 'Sheet1' tab at the bottom left of the pane.

4. Data Source Pane:

Once your data is connected, the Data Source Pane will appear on the left-hand side of the Tableau interface. Here, you can see a preview of your data and perform data transformations or join multiple data sources if necessary.

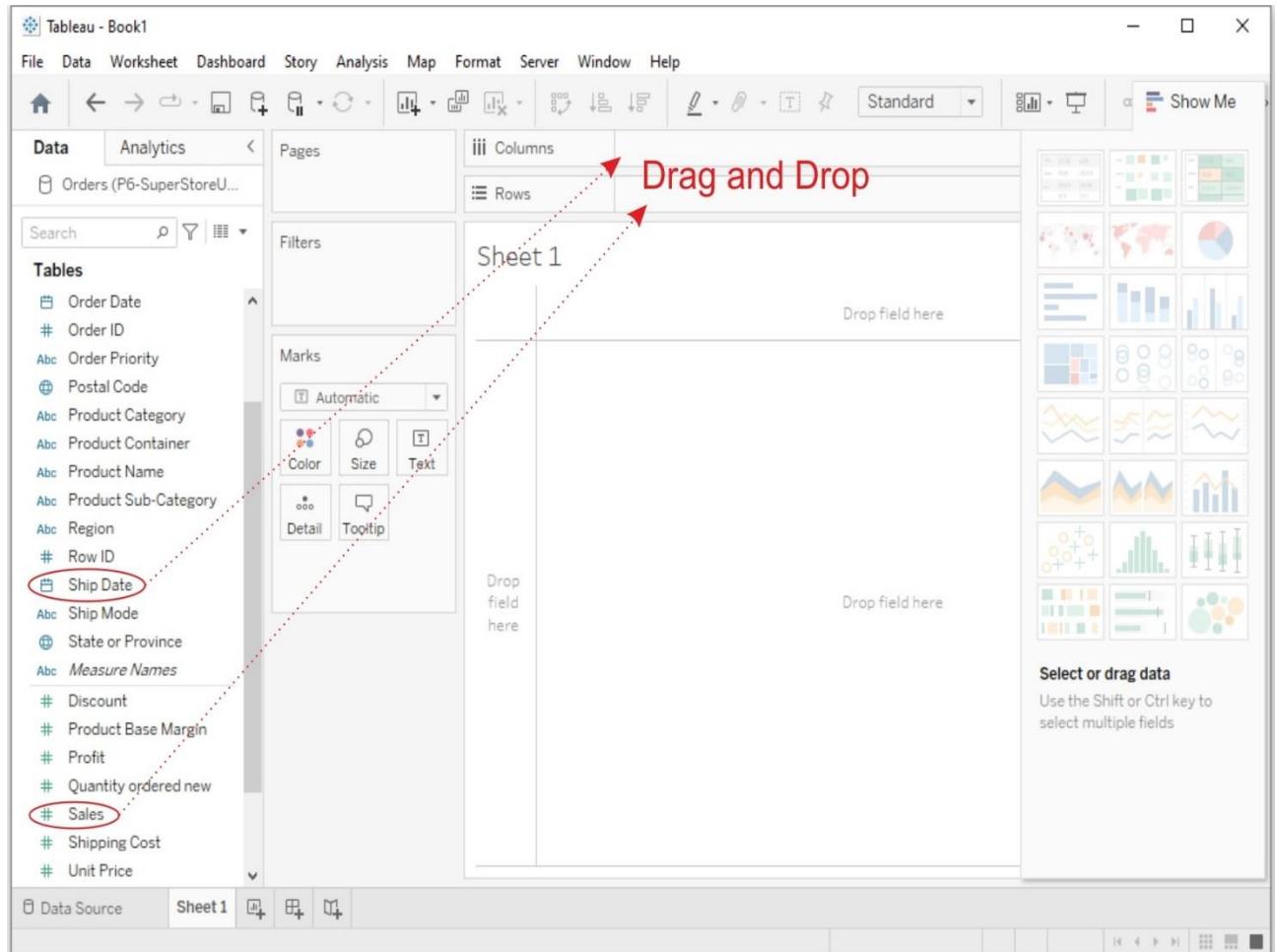
The screenshot shows the Tableau interface with the Data Source pane open. The top navigation bar includes 'File', 'Data', 'Worksheet', 'Dashboard', 'Story', 'Analysis', 'Map', 'Format', 'Server', 'Window', and 'Help'. The 'Data' tab is highlighted. The Data Source pane on the left lists tables and their fields. The main workspace shows a sheet named 'Sheet 1' with various data visualization components like columns, rows, and marks. A red arrow points to the 'Data' tab in the top bar, and another red arrow points to the 'Data Source' tab at the bottom left of the workspace.

5. Creating Basic Charts:

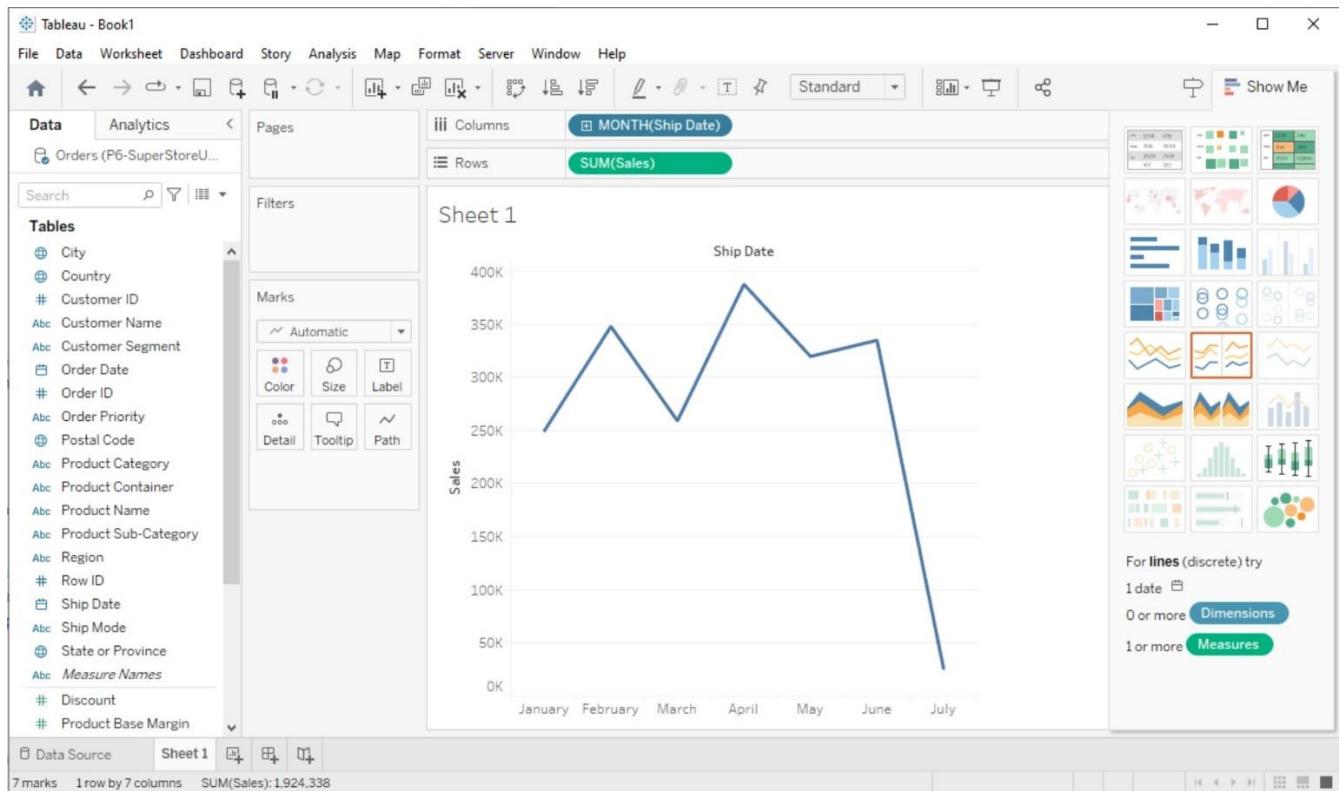
Now, let's create some basic charts using Tableau:

a. Line Chart:

1. From the "**Data Source pane**", drag and drop the date field to the **Columns shelf** and a numeric field (e.g., sales, revenue) to the **Rows shelf**.

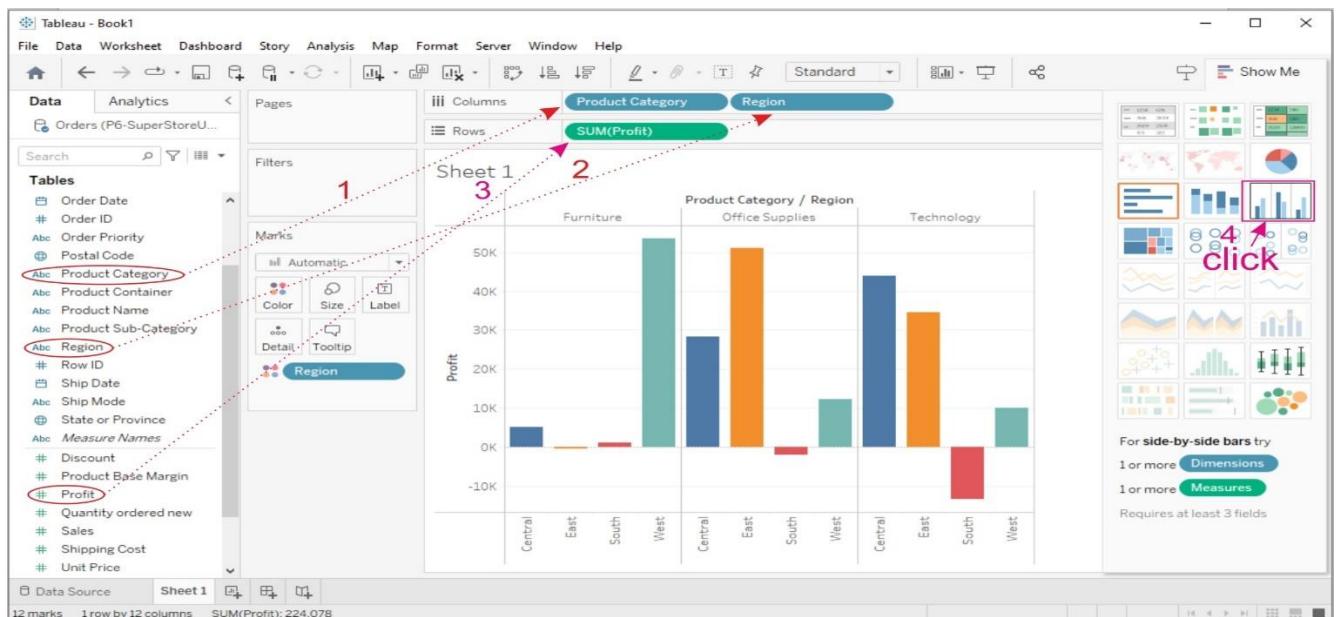


2. Then **Tableau** will automatically create a line chart. You can customize it by adding labels, titles, and formatting.

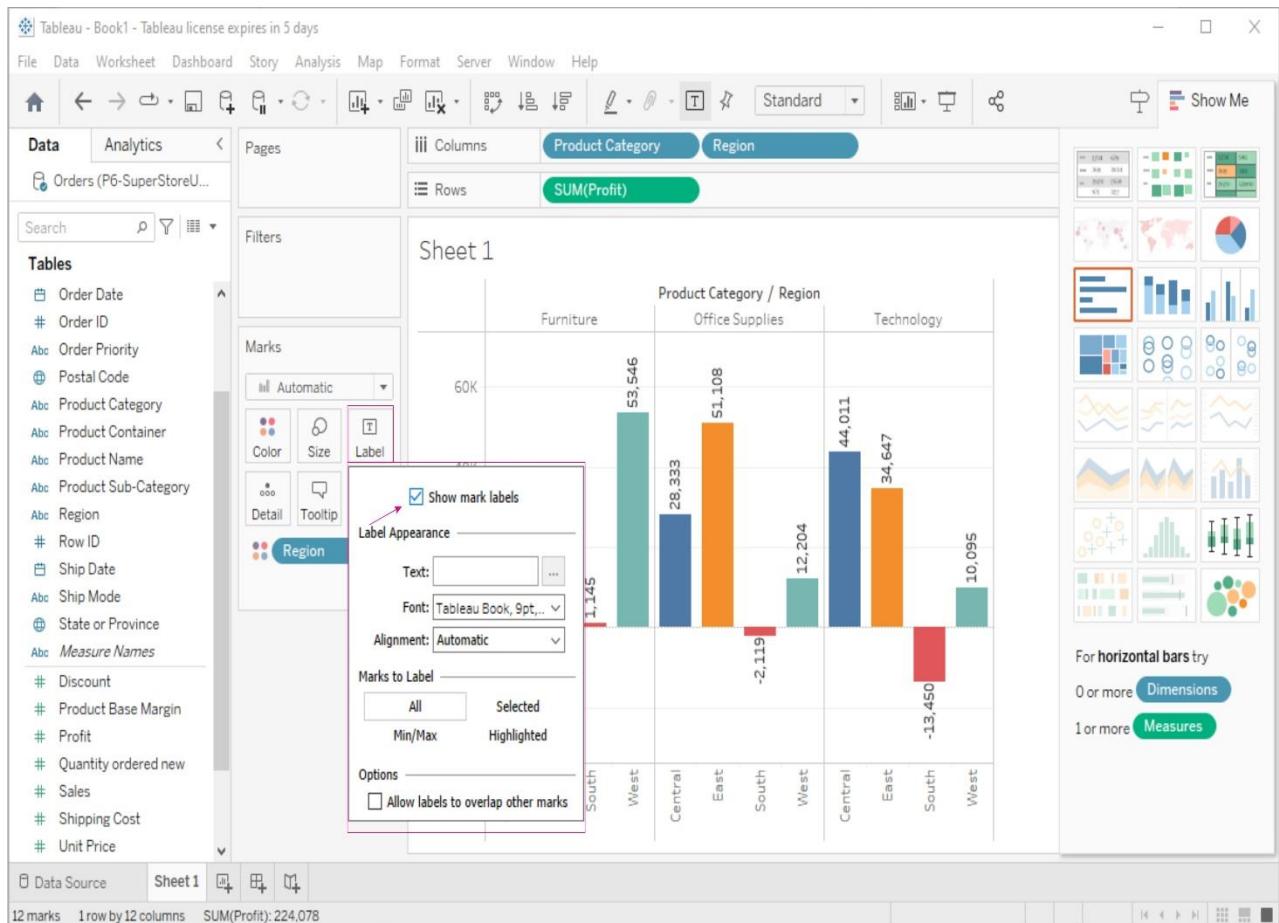


b. Bar Chart:

1. Drag and drop a **categorical field** (e.g., product category, region) to the **Columns shelf** and a **numeric field** to the **Rows shelf**.



2. Then Tableau will create a bar chart. You can adjust the orientation and formatting as needed. To display Labels on the bars click on Lables and select "Show mark lables"



c. Treemap:

1. Drag and drop a categorical field to the Columns shelf.
2. Drag and drop a numeric field to the Size shelf.
3. Tableau will create a treemap visualization. You can further customize it by adjusting colors and labels.

6. Using the Show Me Panel:

The Show Me panel in Tableau helps you explore various chart types based on your data and the fields you select. Here's how to use it:

1. After adding fields to the Rows and Columns shelves, click on the "Show Me" panel located on the left side of the Tableau interface.
2. In the Show Me panel, you'll see a variety of chart options that Tableau recommends based on your data. Click on a chart type to create it.
3. Tableau will automatically generate the selected chart type with your data. You can further customize it as needed.
4. To go back to the regular worksheet view, click the "Clear" button in the Show Me panel.

Aim:

Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculationsand fields

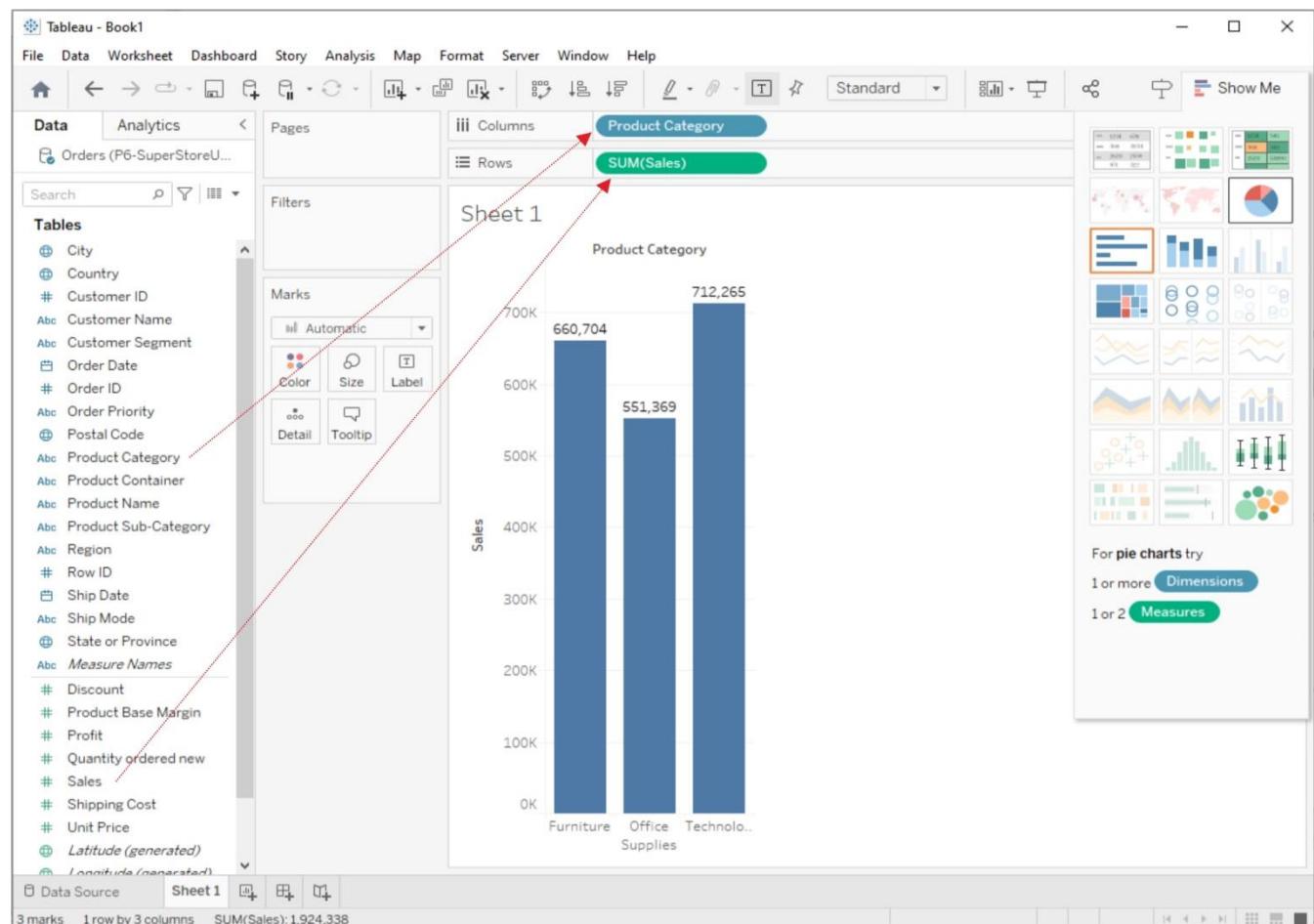
Solution :

Tableau offers a powerful set of calculation tools that allow you to manipulate, transform, and analyze your data in various ways. Here's an overview of some key concepts related to Tableau calculations, including SUM, AVG (average), and aggregate functions, as well as creating custom calculations and fields

SUM and AVG (Average) Functions

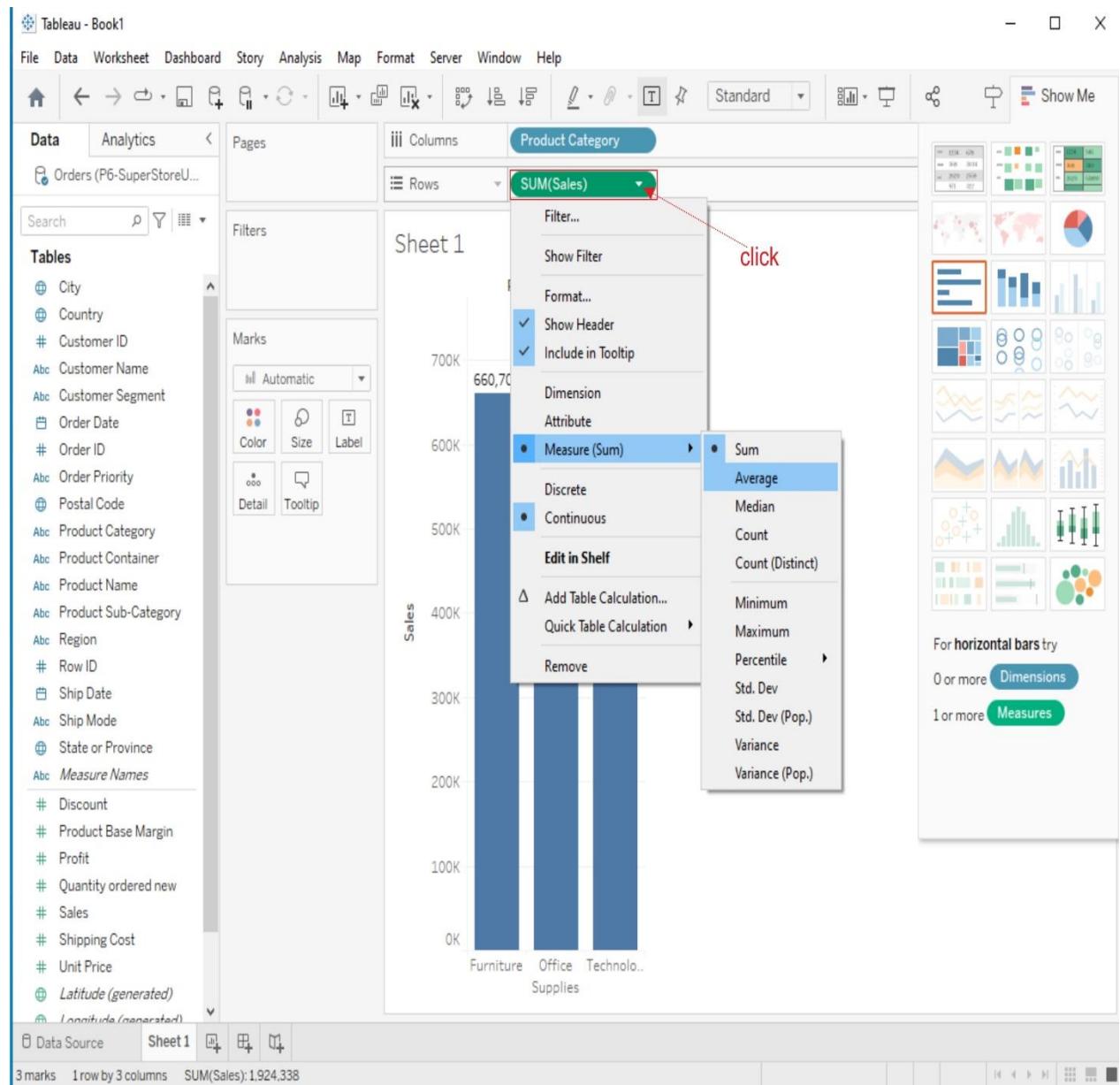
SUM Function

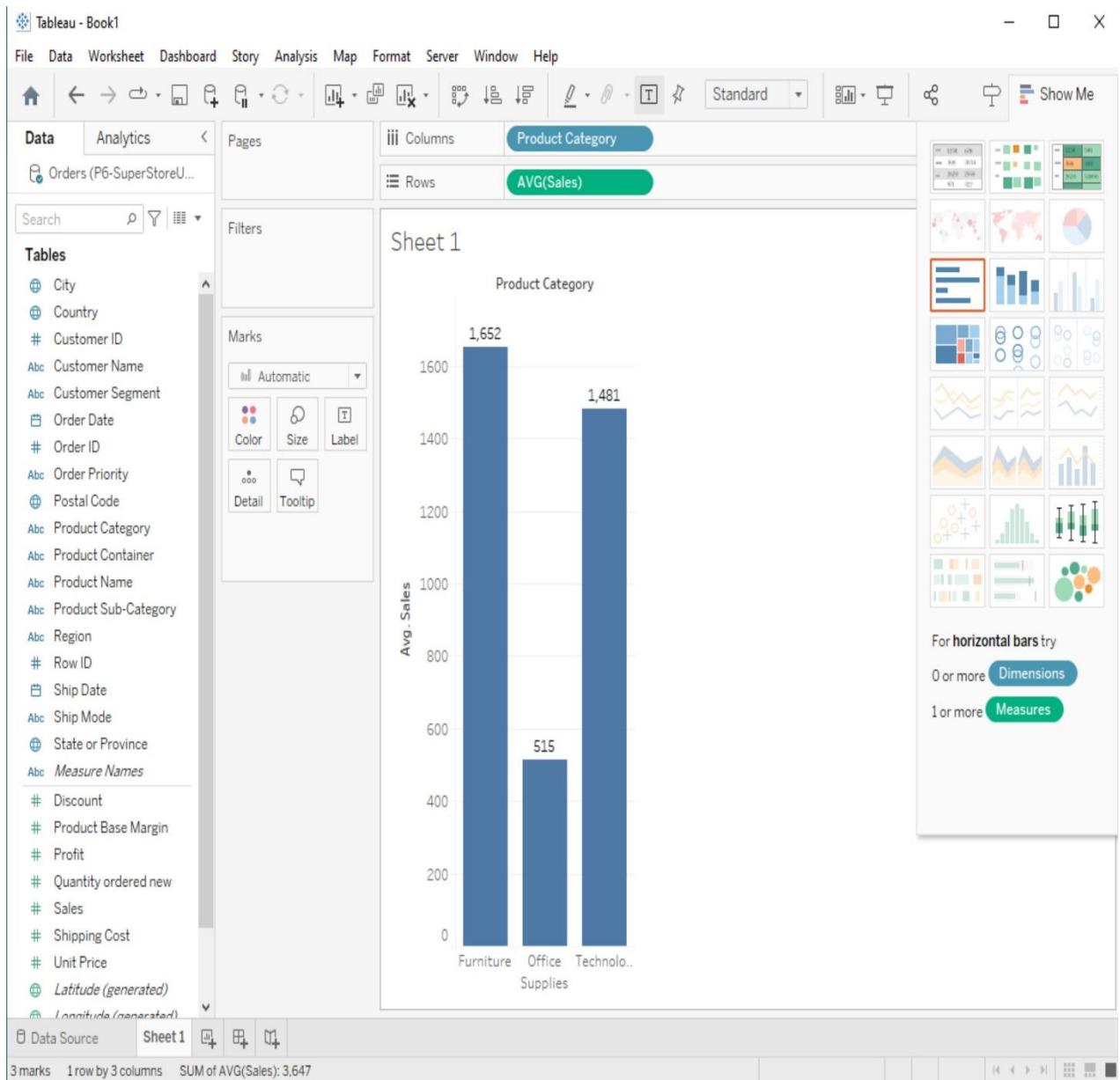
The SUM function in Tableau calculates the total sum of a numeric field. You can use it to find the sum of values in a column or as part of a more complex calculation. To use SUM, simply drag and drop a numeric field into the "SUM" shelf, or you can create a calculated field using the SUM function.



AVG (Average) Function

The AVG function calculates the average (mean) value of a numeric field. Like SUM, you can use it by dragging a numeric field into the "AVG" shelf or creating a calculated field with the AVG function.





Aggregate Functions:

Tableau provides a range of aggregate functions that allow you to perform calculations on groups of data. Common aggregate functions include SUM, AVG, COUNT, MIN (minimum value), and MAX (maximum value). These functions are particularly useful when you want to analyze data at different levels of granularity (e.g., by category, region, or time period).

Tableau - Book1

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Product Category

Filter... Show Filter Show Highlighter Sort... Format... Show Header Include in Tooltip Edit Aliases... Dimension Attribute Measure Minimum Maximum Count Count (Distinct) Remove

Region Furni

Central East South West

City Country Customer ID Customer Name Customer Segment Order Date Order ID Order Priority Postal Code Product Category Product Container Product Name Product Sub-Category Region Row ID Ship Date Ship Mode State or Province Measure Names

Discount Product Base Margin Profit Quantity ordered new Sales Shipping Cost Unit Price Latitude (generated) Longitude (generated)

Tables

Orders (P6-SuperStoreU...)

Search

Marks

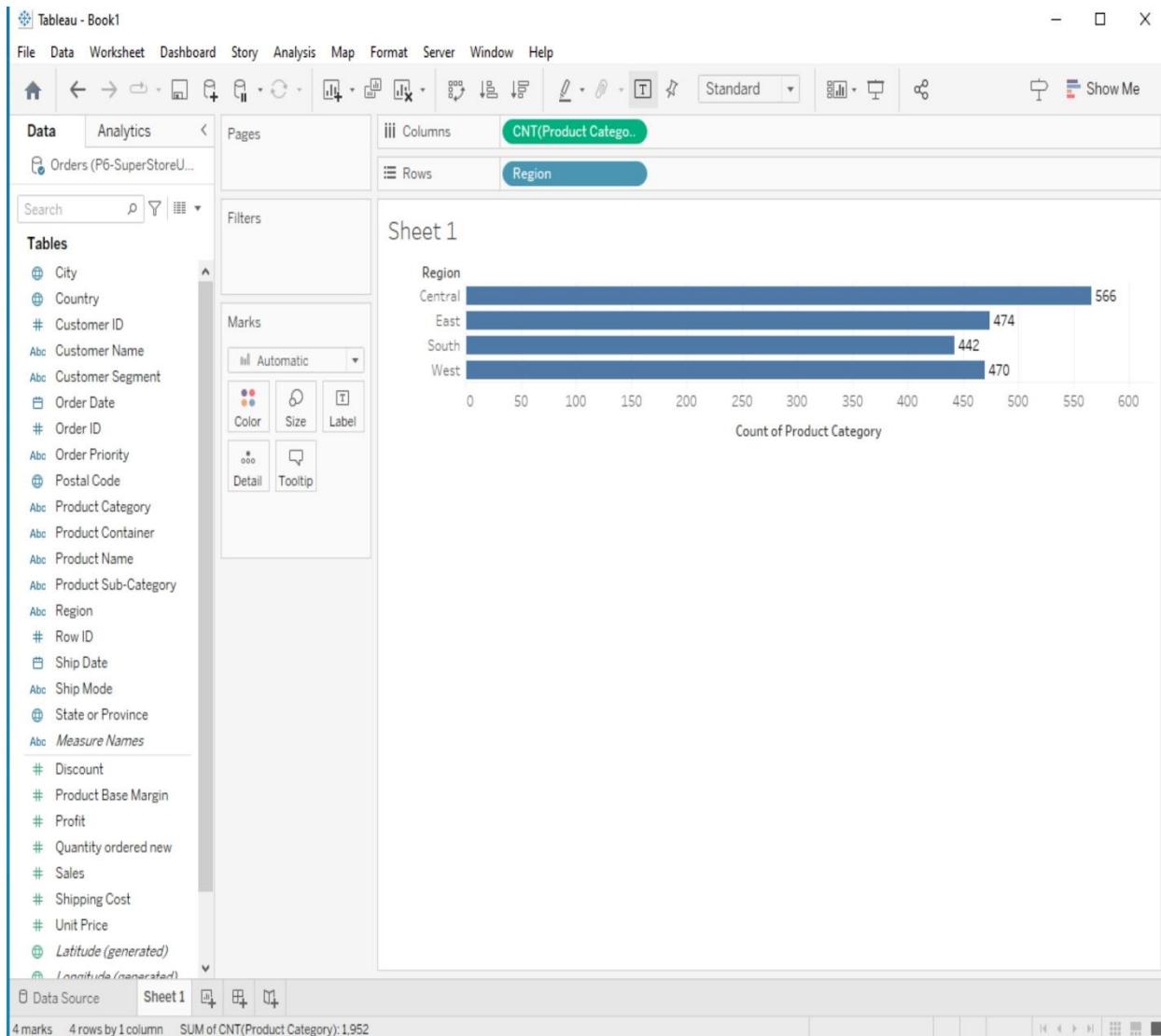
Automatic Color Size Text Detail Tooltip

Sheet 1

Data Source Sheet1

12 marks 4 rows by 3 columns

This screenshot shows the Tableau desktop application interface. A context menu is open over a dimension item named 'Product Category' in the top right corner. The menu includes options for filtering, highlighting, sorting, and formatting, as well as specific dimension and attribute actions. A sub-menu for 'Measure' is open, showing 'Minimum', 'Maximum', 'Count', and 'Count (Distinct)', with 'Count' being the selected option. The left side of the screen displays the data source tree, showing various dimensions and measures. The bottom of the screen shows the worksheet pane with 'Sheet 1' selected.

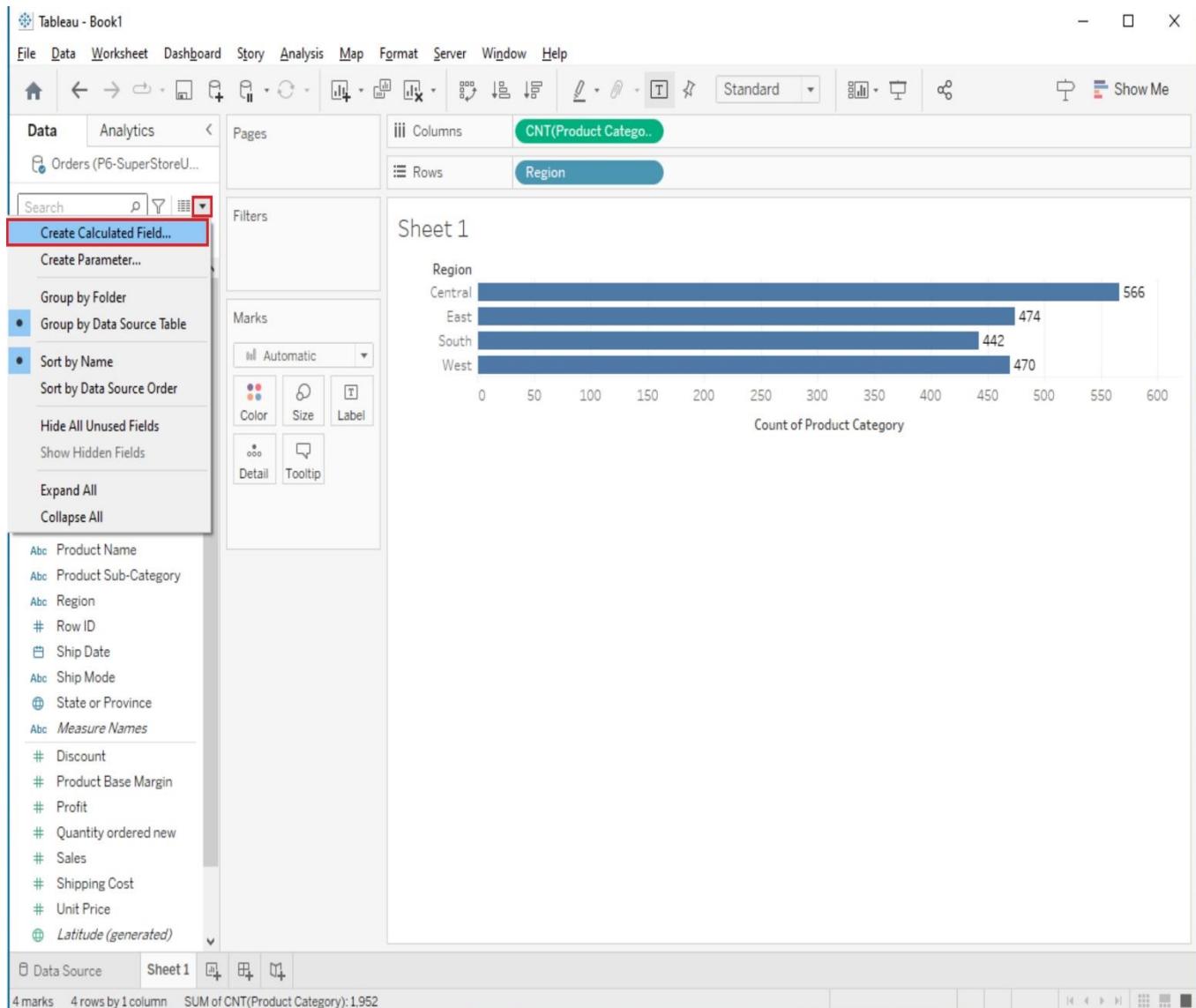


Creating Custom Calculations

Tableau allows you to create custom calculations using calculated fields. Here's how to create a custom calculation:

1. Create a New Calculated Field

In the Data Source Pane, right-click on your data source and select "Create Calculated Field".



Alternatively, you can create a calculated field by right-clicking on a shelf in your worksheet and choosing "Create Calculated Field".

2. Enter Your Calculation:

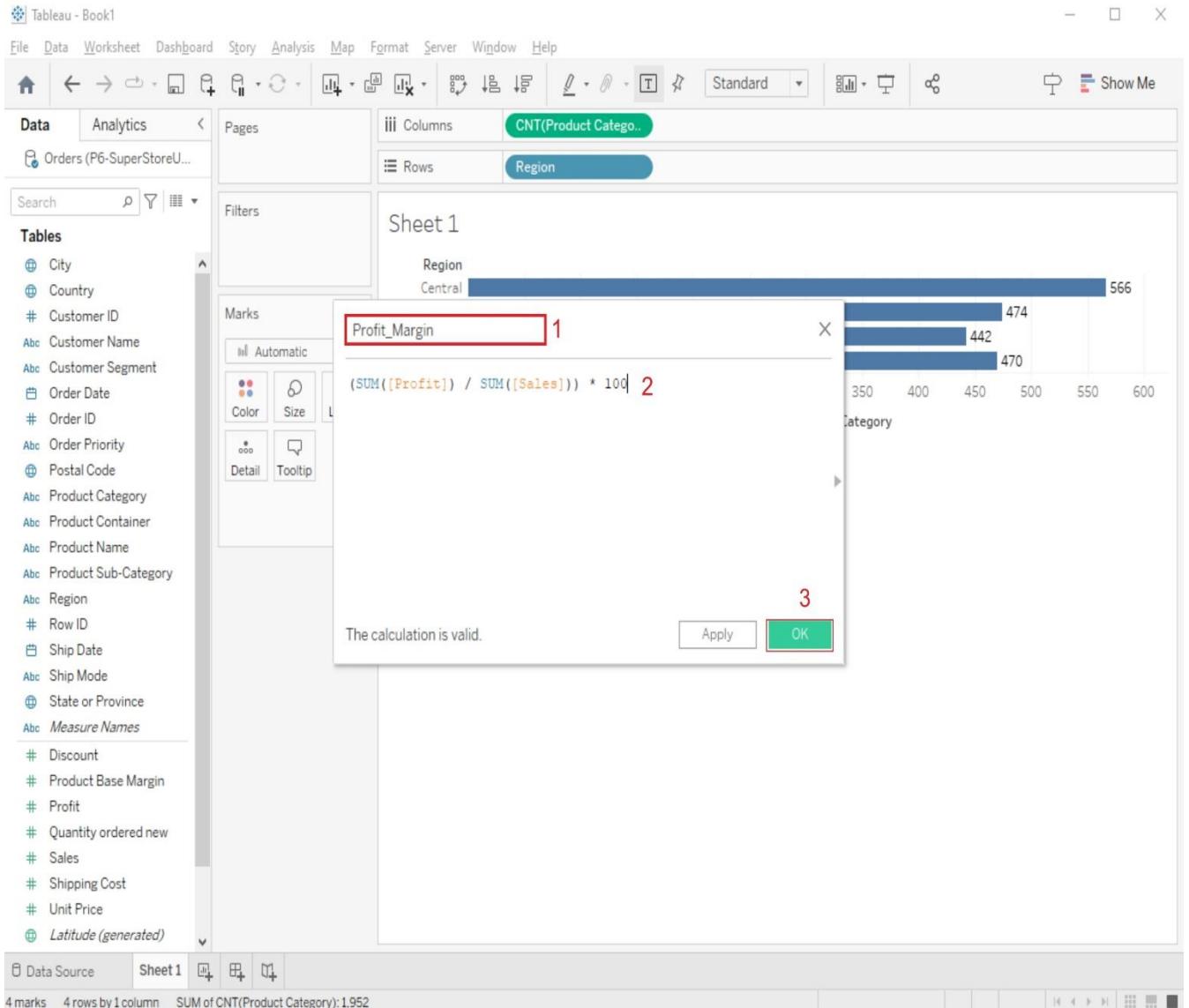
In the calculated field editor, you can use functions, operators, and field references to define your calculation.

For example, you can create a calculated field to calculate profit margin as $(\text{SUM}([\text{Profit}]) / \text{SUM}([\text{Sales}])) * 100$.

3. Name and Save the Calculated Field:

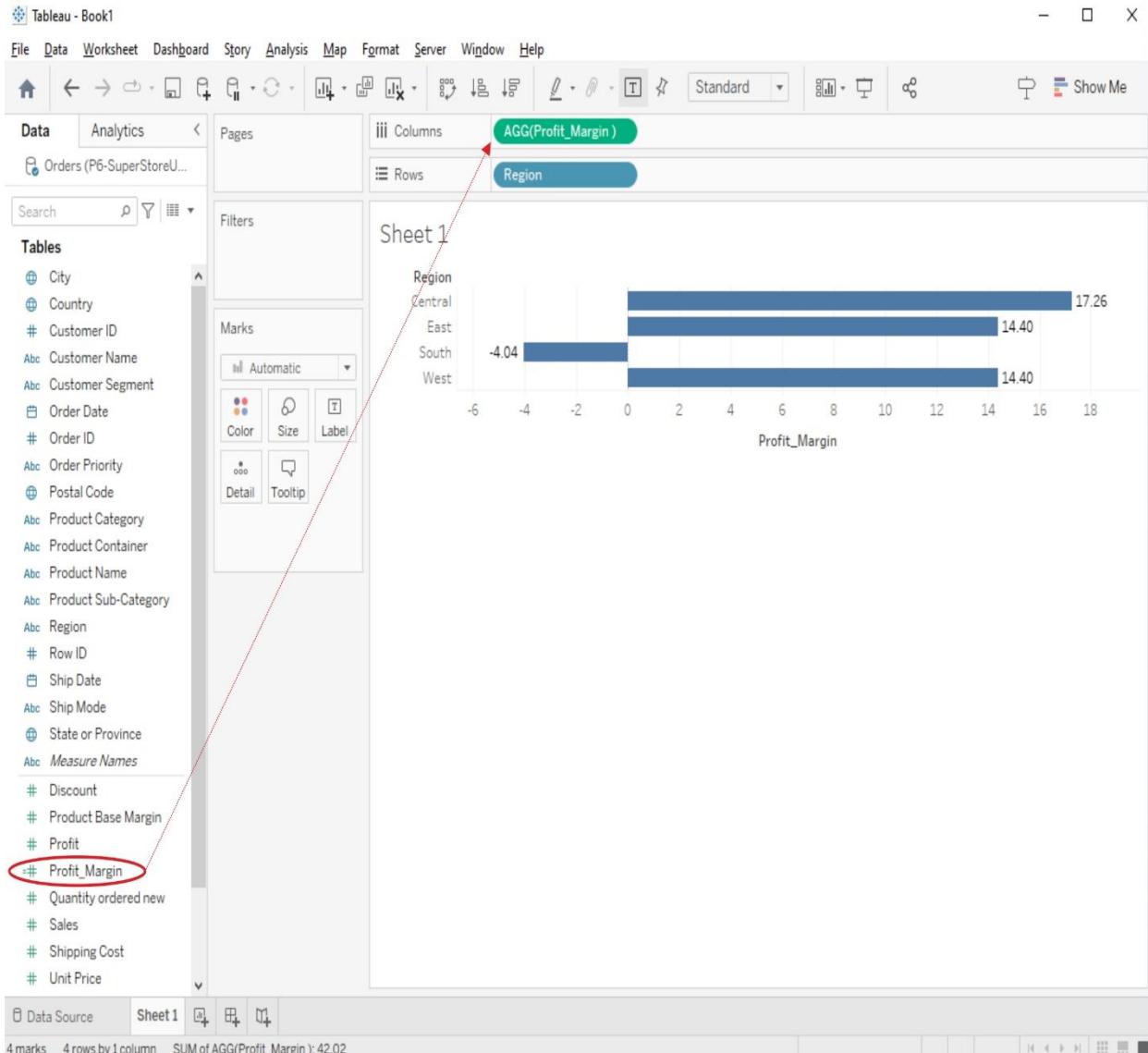
Give your calculated field a meaningful name.

Click the "OK" or "Apply" button to save the calculated field.



4. Use the Calculated Field in Your Worksheet:

You can now use the calculated field like any other field in your worksheet. Drag it to the Rows or Columns shelf, use it in filters, or create visualizations based on it.



Aim:

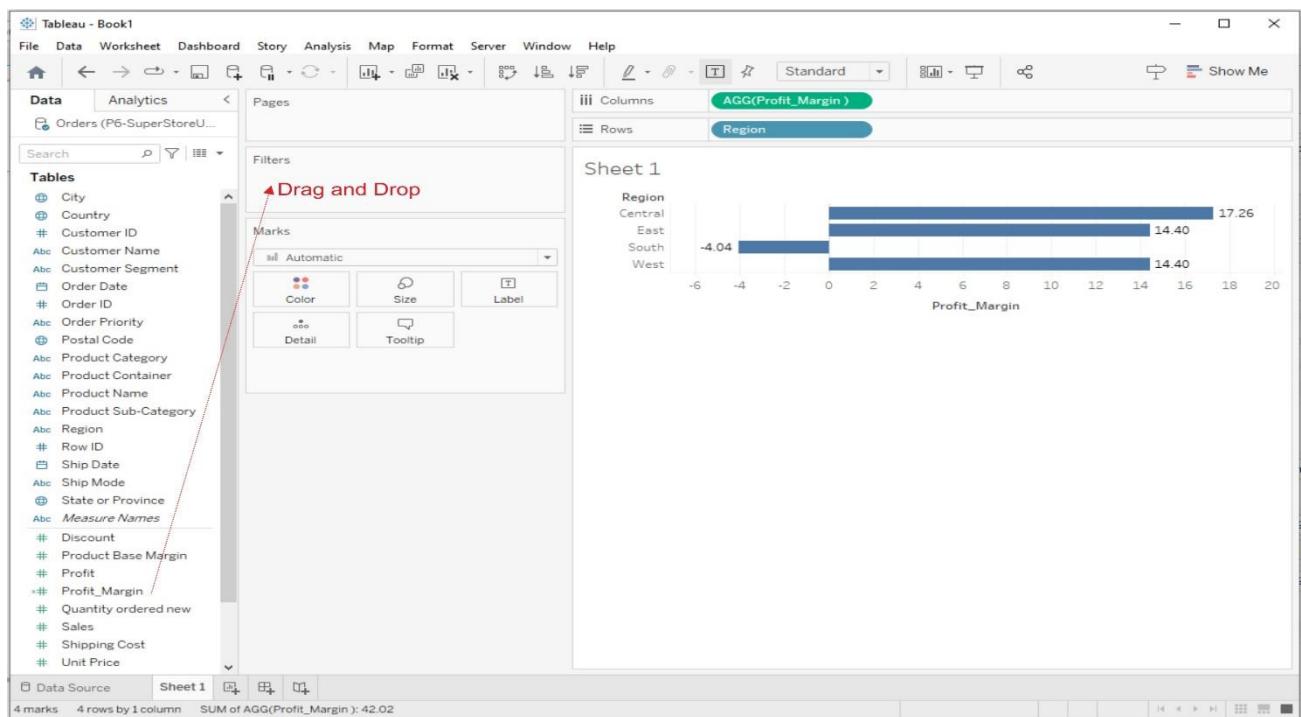
Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, and Formatting specific parts of the view.

Solution :

Applying New Data Calculations to Visualizations

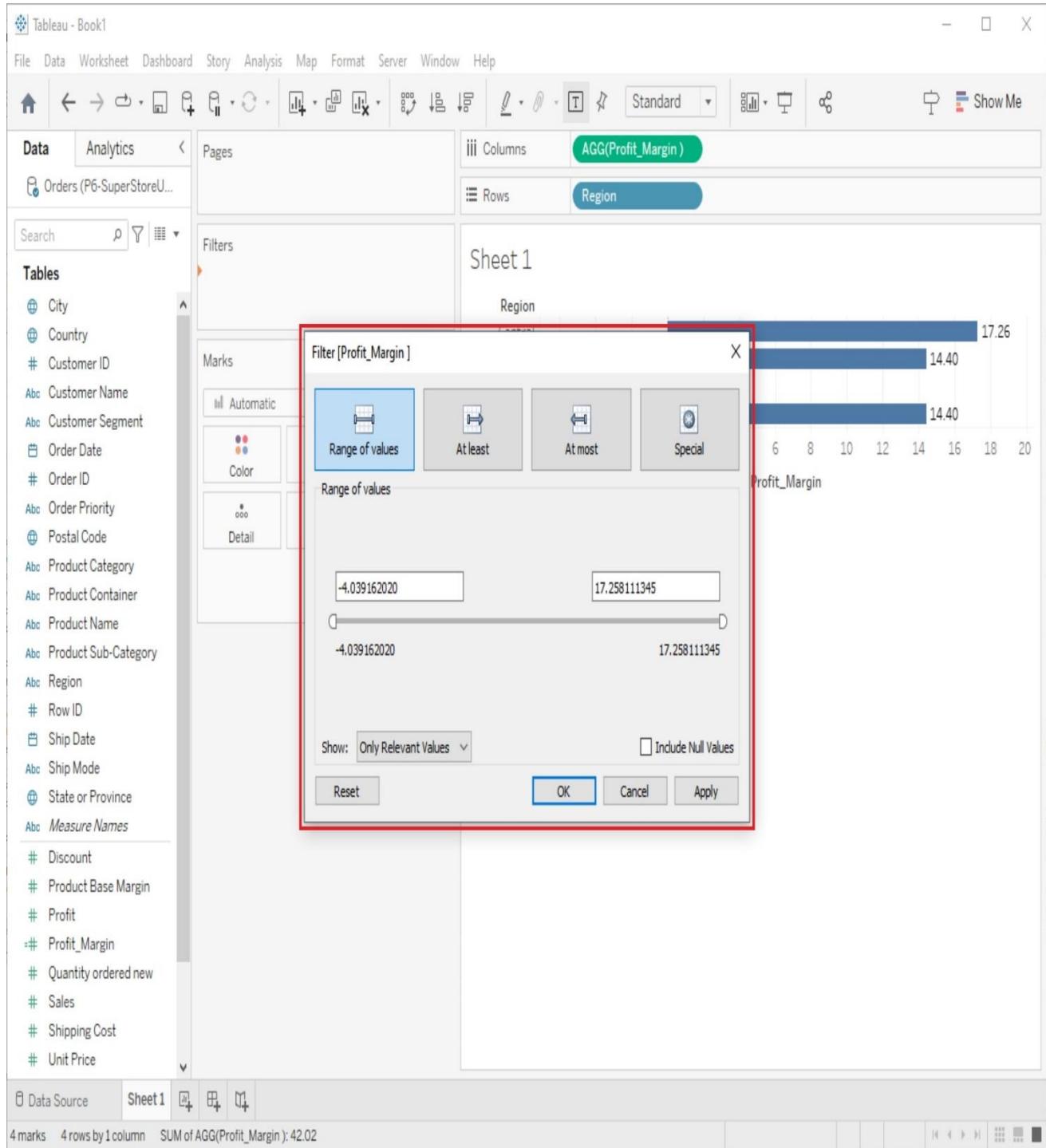
1. Drag and Drop Calculated Fields:

To apply your newly created calculated fields to a visualization, simply drag and drop them onto the appropriate shelves in your worksheet. For example, you can drag a calculated field to the Rows or Columns shelf, use it in filters, or place it on the Marks card to control the appearance of marks.



2. Filter with Calculated Fields:

Create filters using calculated fields to control which data points are displayed in your visualization. You can use calculated fields to filter by specific criteria, such as a calculated date range or a custom ranking.



Filter [Profit_Margin] X

Range of values

-4.039162020 17.258111345

-4.039162020 17.258111345

Show: Only Relevant Values ▾ Include Null Values

Reset OK Cancel Apply

Filter [Profit_Margin] X

At least

-4.039162020 17.258111345

-4.039162020 17.258111345

Show: Only Relevant Values ▾ Include Null Values

Reset OK Cancel Apply

Filter [Profit_Margin] X

At most

-4.039162020 17.258111345

-4.039162020 17.258111345

Show: Only Relevant Values ▾ Include Null Values

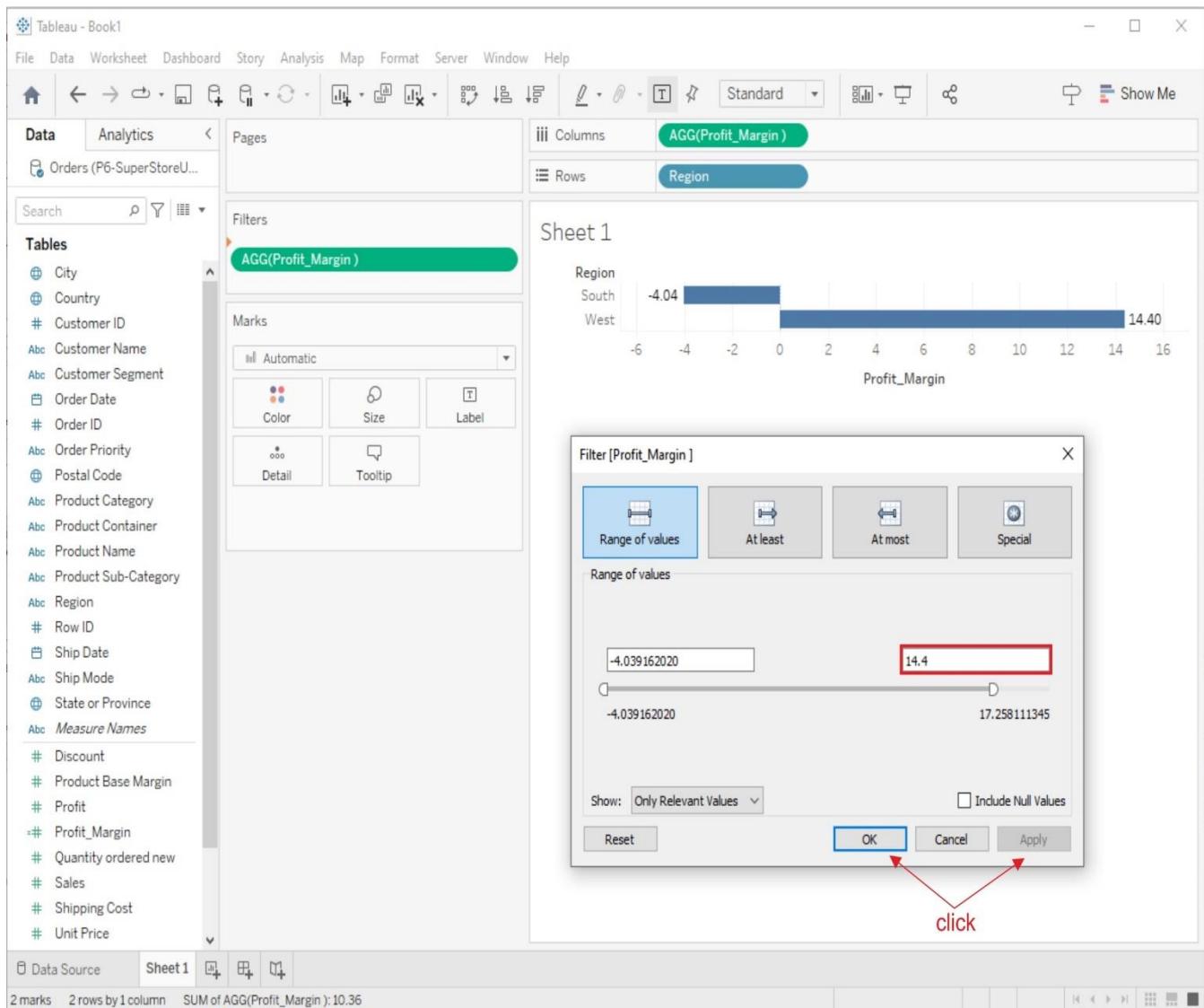
Reset OK Cancel Apply

Filter [Profit_Margin] X

Special

Null values
 Non-null values
 All values

Reset OK Cancel Apply

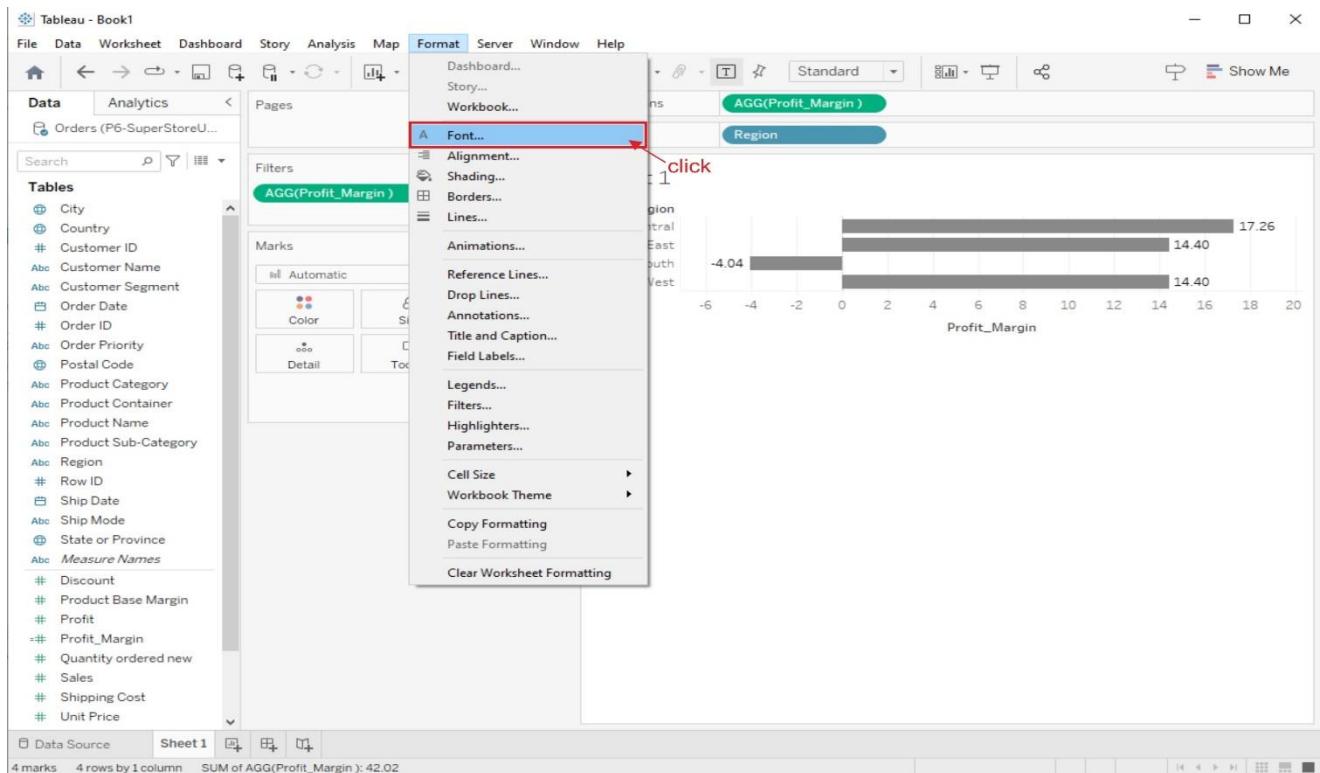


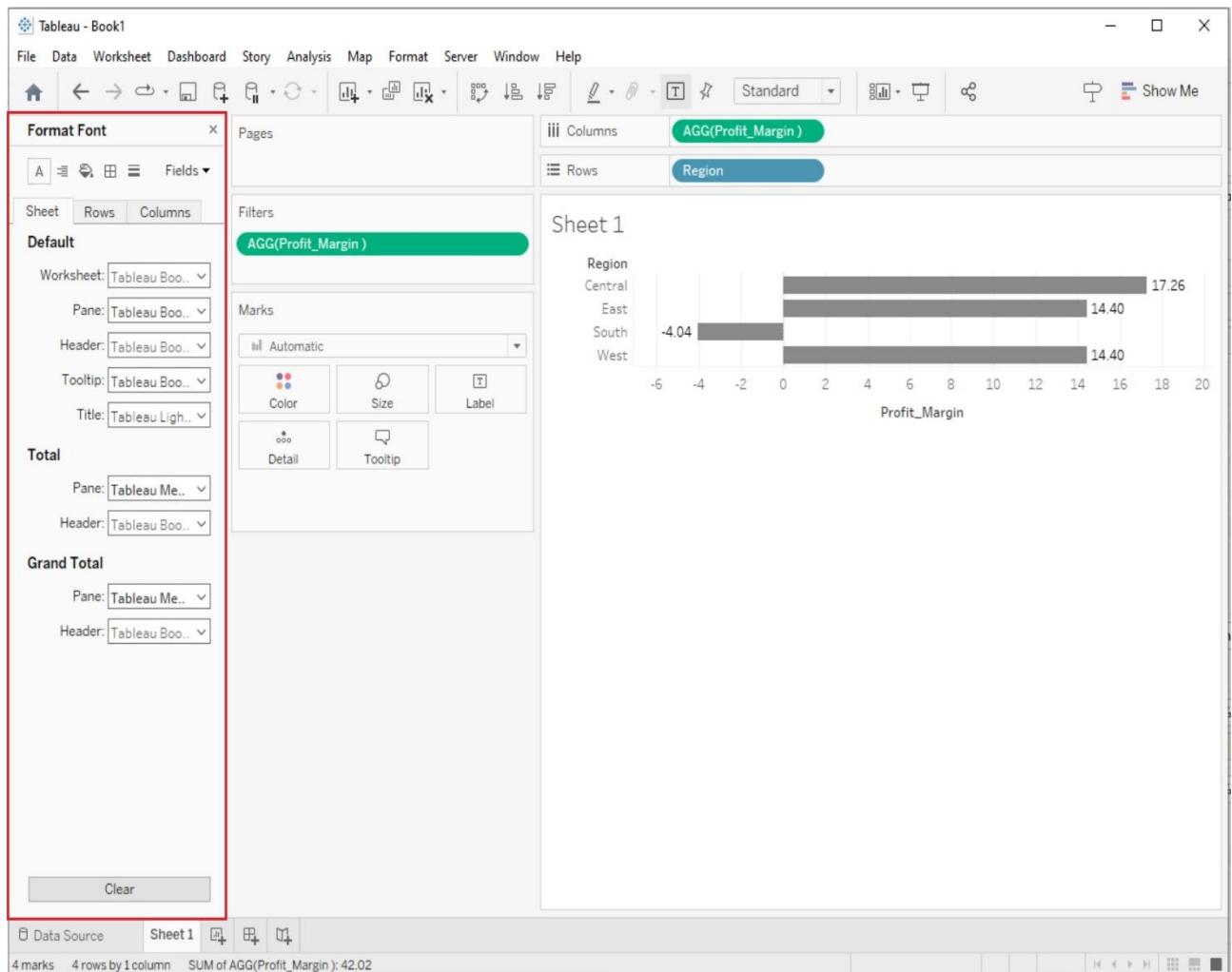
Formatting Visualizations

Tableau provides a wide range of formatting options to make your visualizations more appealing and informative:

1. Format Pane:

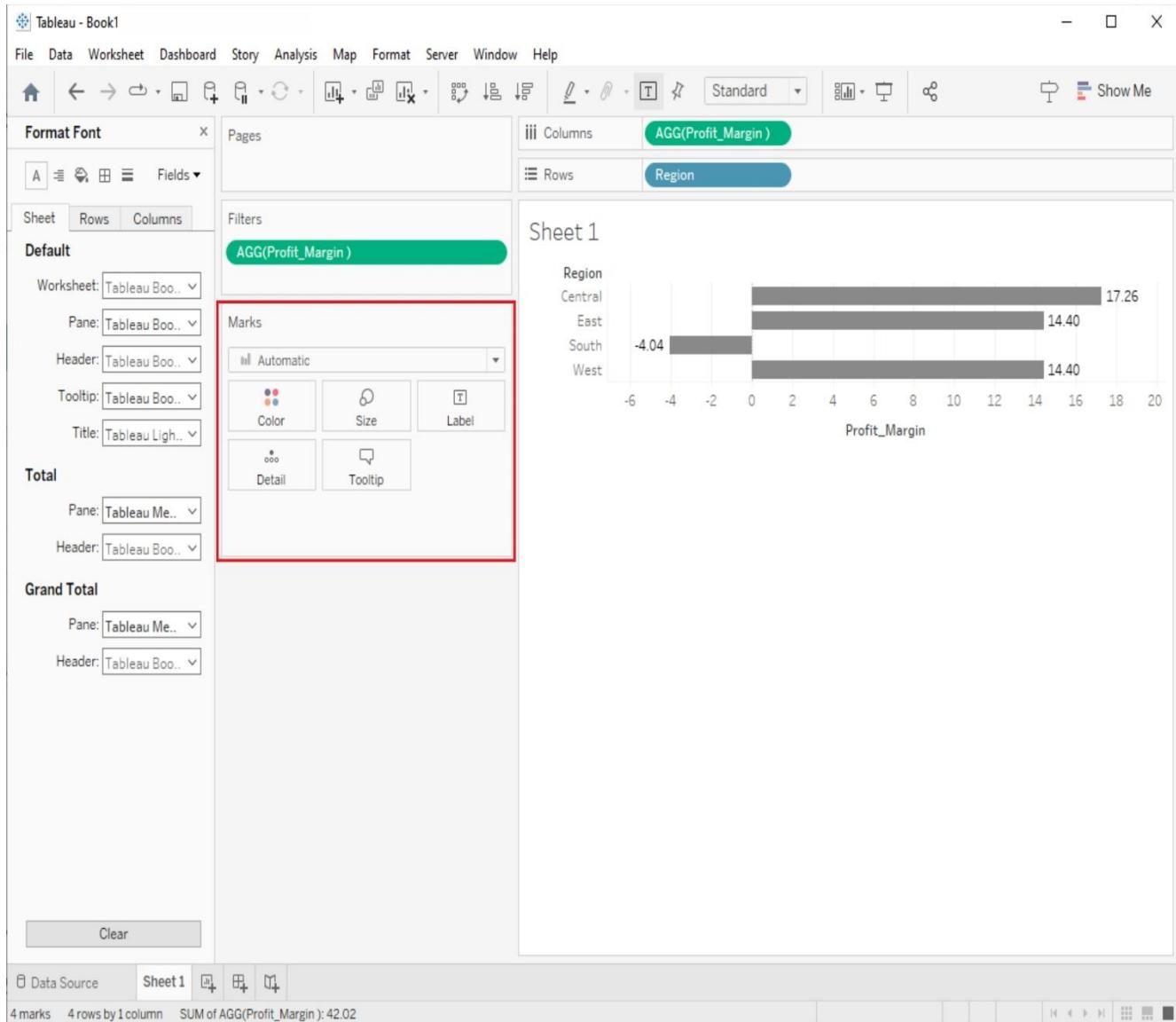
On the left side of the Tableau interface, you'll find the Format pane. It allows you to format various aspects of your visualization, such as fonts, colors, lines, shading, and borders. Simply select the element you want to format and use the options in the Format pane to make changes.





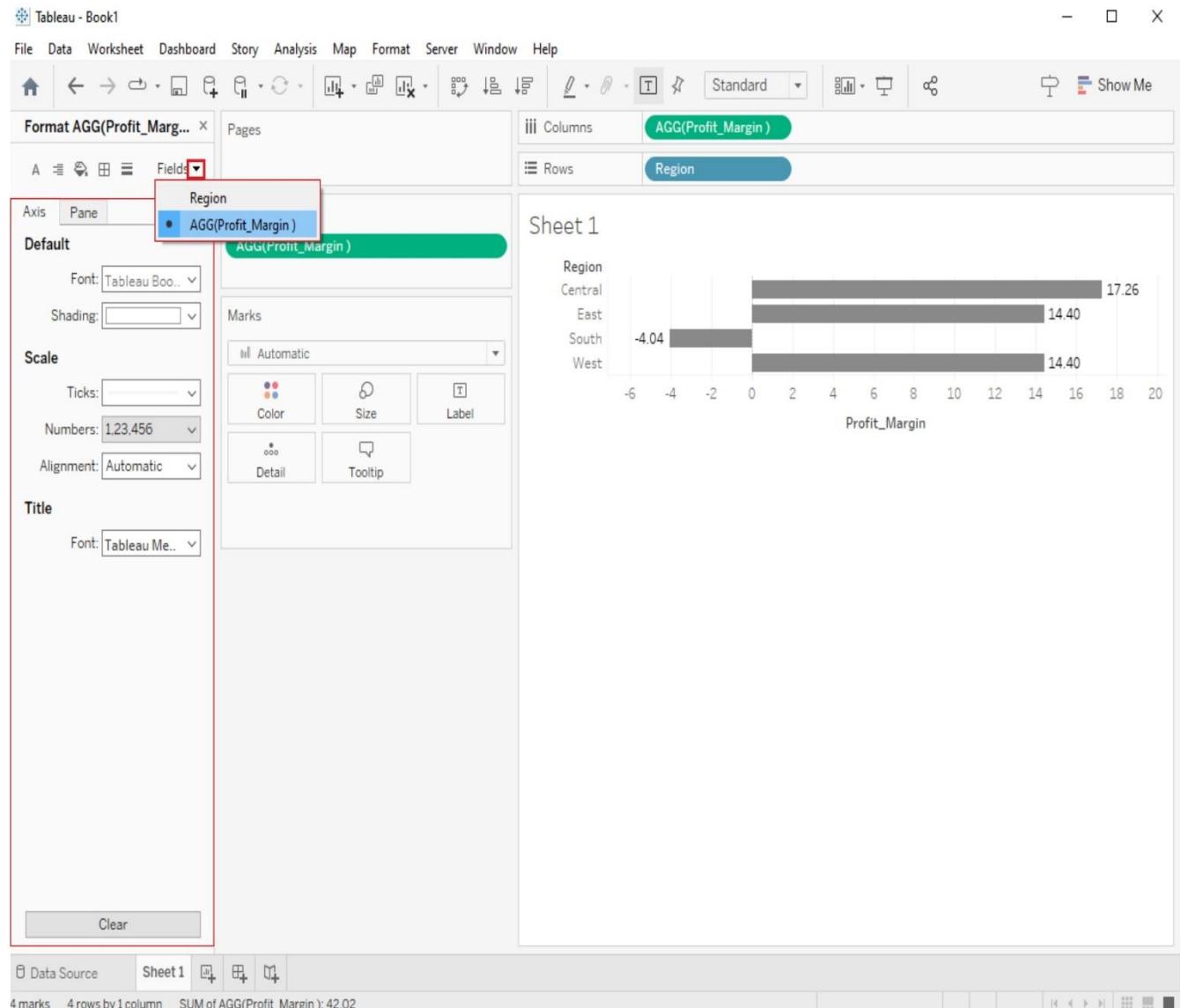
2. Marks Card:

The Marks card, located above your visualization, offers formatting options specific to the type of marks you're using (e.g., color, size, label). Click on the Marks card to access these options and modify how your data is represented.



3. Axis and Gridlines:

You can format axis labels, titles, and gridlines to improve the readability of your visualization. Right-click on an axis or gridline to access formatting options.



4. Legends and Color Scales:

Customize legends and color scales to provide context for your visualizations. You can change colors, labels, and the position of legends to match your data.

The screenshot shows the Tableau interface with a bar chart visualization. The chart has 'Region' on the vertical axis and 'Profit_Margin' on the horizontal axis. The bars represent different regions with values: Central (17.26), East (14.40), South (-4.04), and West (14.40). A legend is visible at the top right, showing a green circle next to 'AGG(Profit_Margin)' and a blue circle next to 'Region'. A tooltip for the South bar shows the value '-4.04'. In the bottom left corner, there is a message: '4 marks 4 rows by 1 column SUM of AGG(Profit Margin): 42.02'.

Format Legends

Title

- Font: Tableau Me..
- Alignment: Left

Body

- Font: Tableau Boo..
- Shading: None
- Border: None

Marks

- Automatic
- Color
- Detail

Legend...

Filters...

Highlighters...

Parameters...

Cell Size

Workbook Theme

Copy Formatting

Paste Formatting

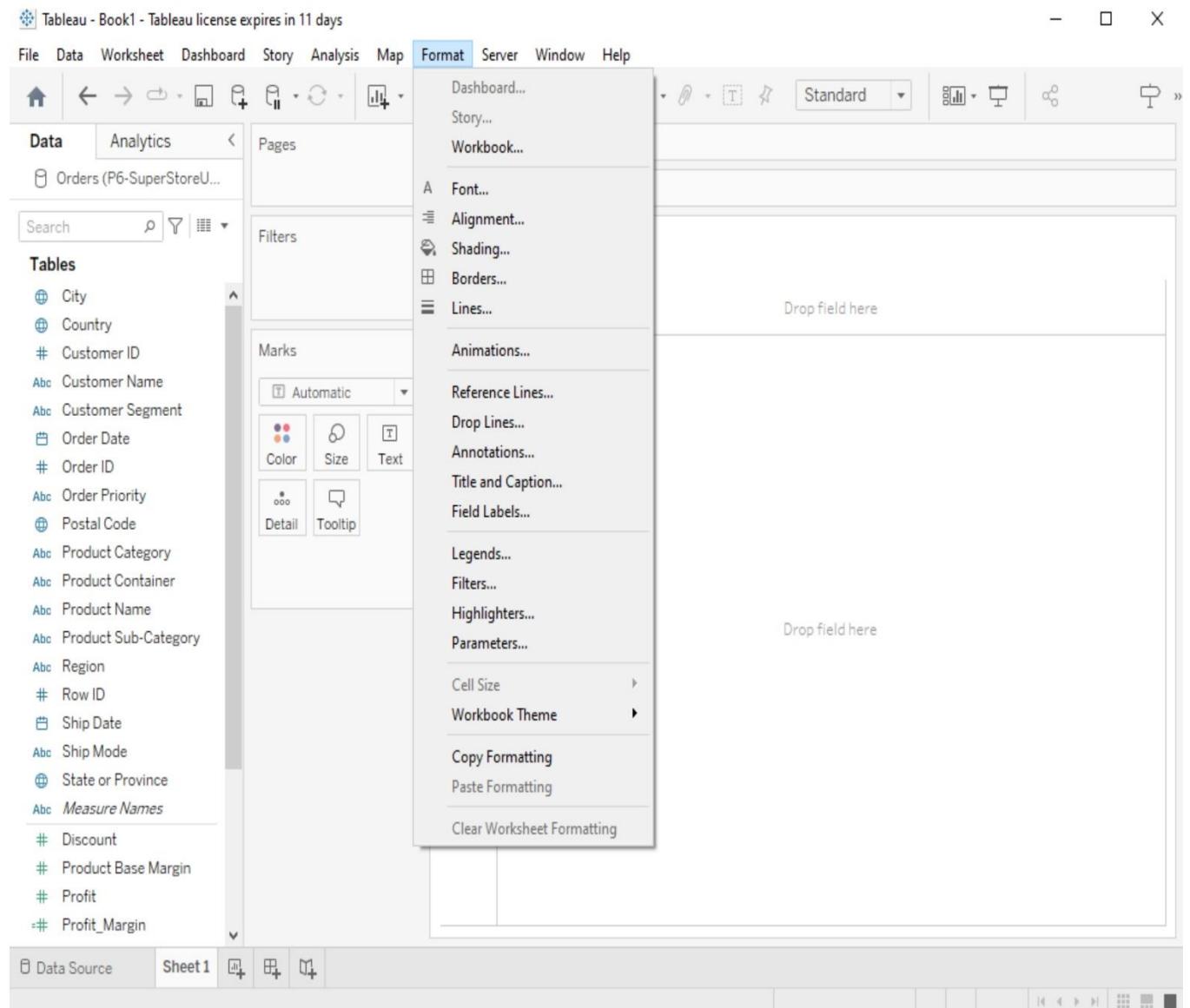
Clear Worksheet Formatting

Formatting Tools and Menus

Tableau provides several formatting tools and menus to help you refine the appearance of your visualizations:

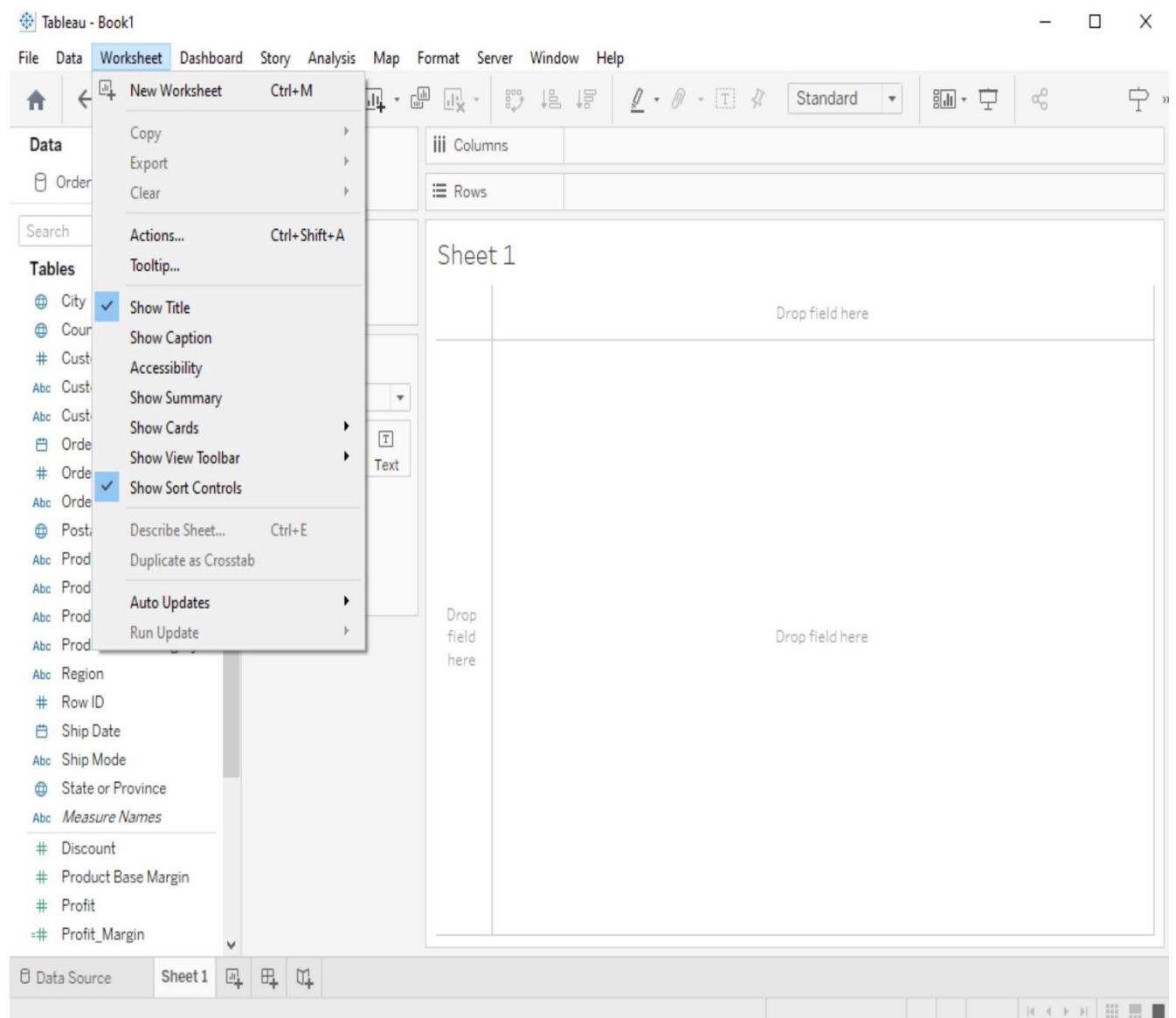
1. Format Menu:

The Format menu at the top of the Tableau interface provides access to various formatting options, including font styles, shading, borders, alignment, and more. You can use this menu to format text, labels, and other elements.



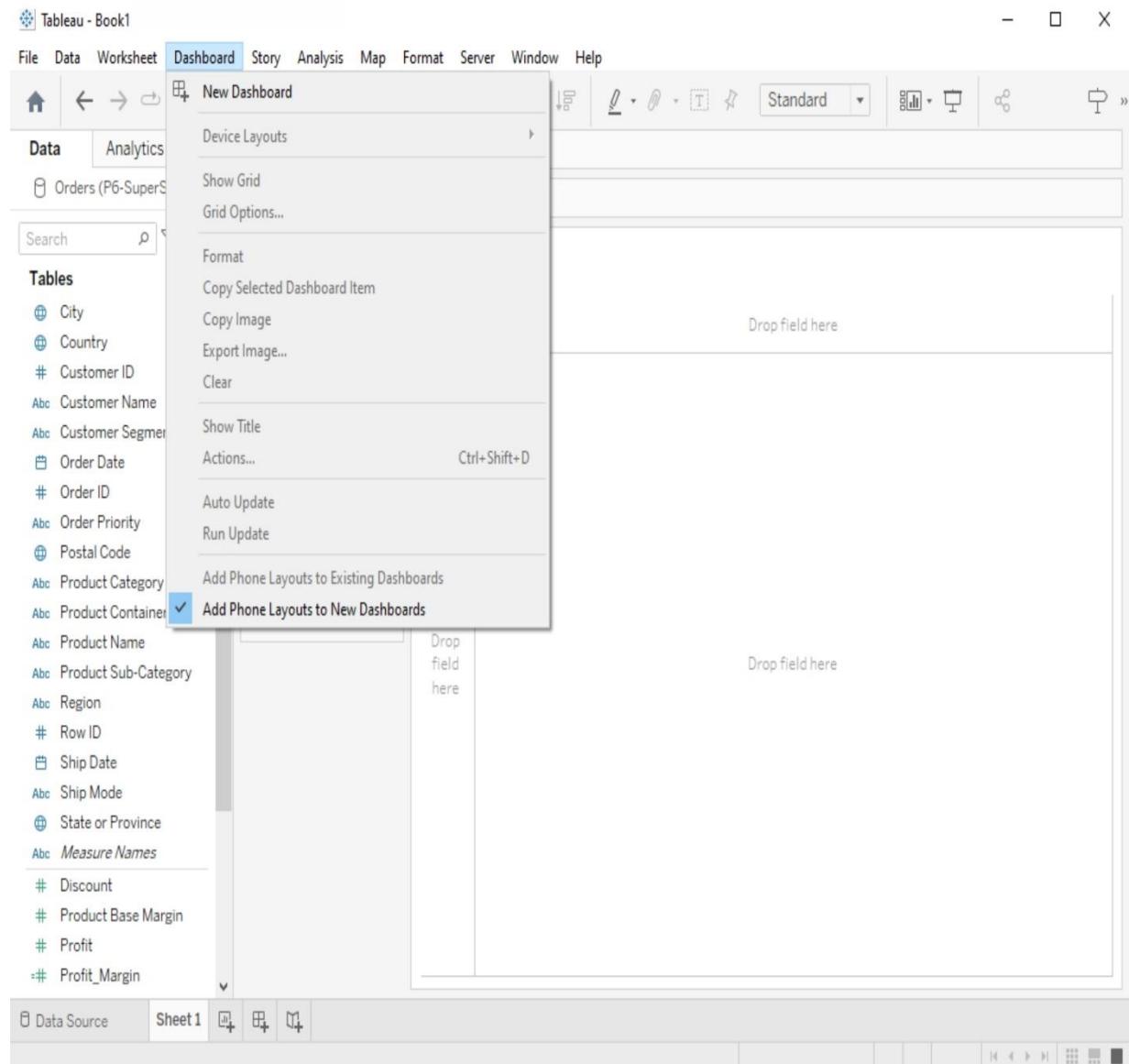
2. Worksheet Menu:

In the Worksheet menu, you'll find options to format the entire worksheet, including background color, borders, and worksheet title. You can also adjust the worksheet size.



3. Dashboard Menu:

If you're working with dashboards, the Dashboard menu allows you to format the entire dashboard layout, including background, size, and title.

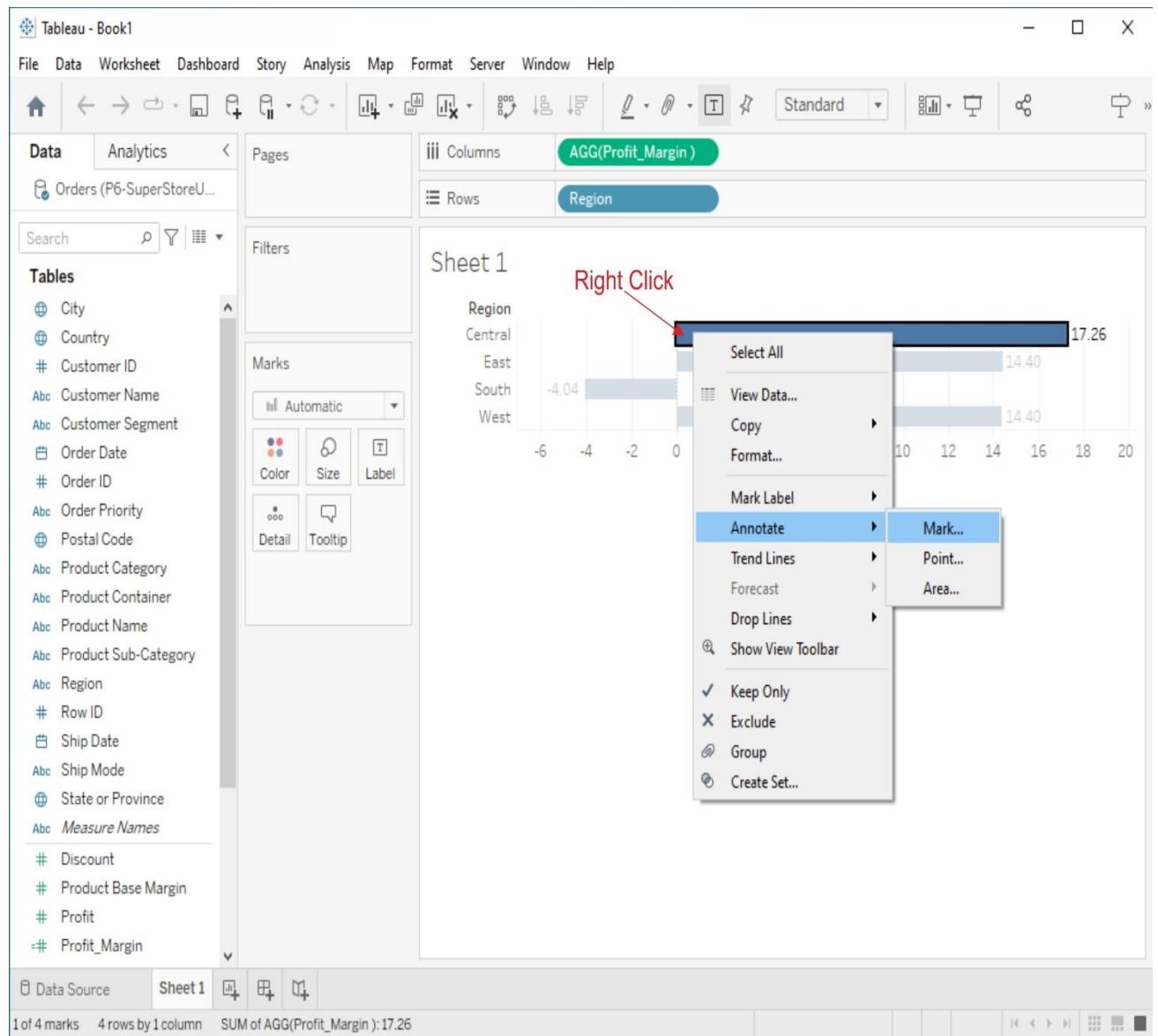


Formatting Specific Parts of the View

Tableau lets you format specific elements of your visualization:

1. Annotations:

You can add annotations to your visualizations to highlight important points or provide additional context. Format these annotations using the options available when you right-click on an annotation.



2. Tooltips:

Customize tooltips to display relevant information when users hover over data points. You can format tooltips to show or hide specific fields and control their appearance.

The screenshot shows the Tableau desktop interface with a tooltip editor dialog open. The main workspace displays a bar chart with three bars representing different regions: East, South, and West. The East bar has a value of 14.40, the South bar has a value of -4.04, and the West bar has a value of 14.40. The tooltip editor dialog is centered, with the 'Tooltip' tab selected. Inside the dialog, the tooltip content is defined as:

```
Region: <Region>
Profit_Margin: <AGG(Profit_Margin)>
```

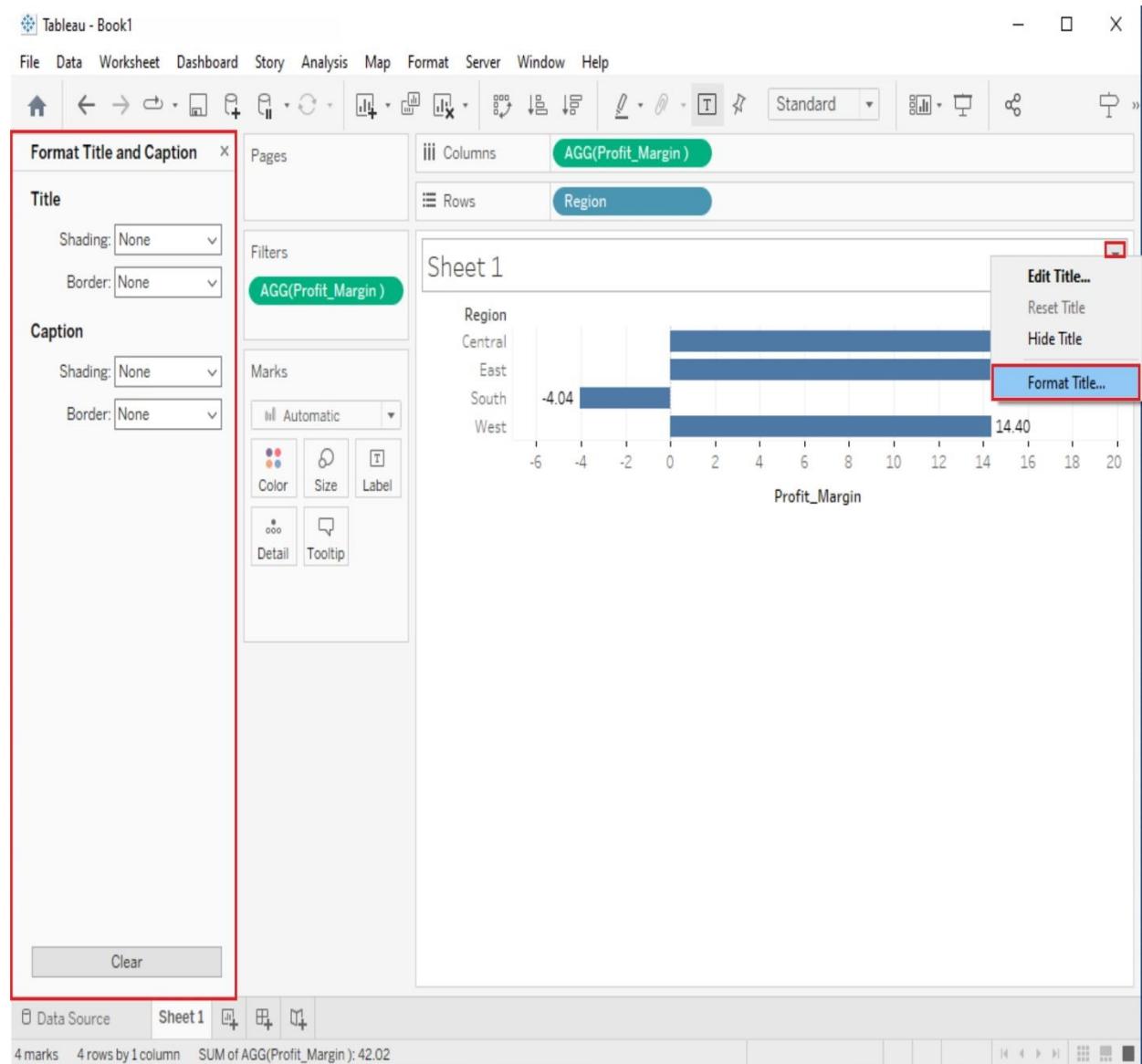
Below the content area, there are three checkboxes:

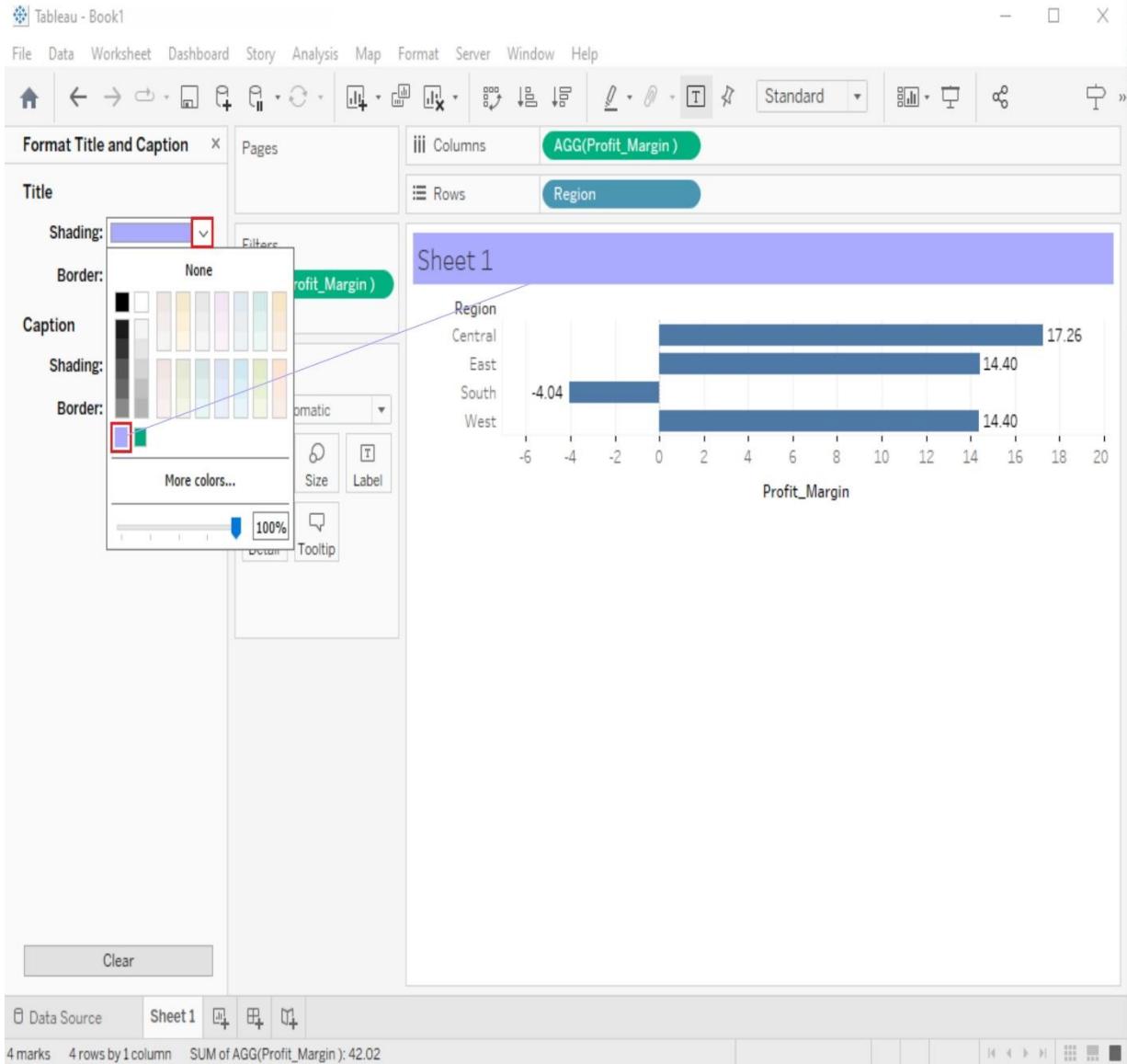
- Show tooltips (selected)
- Responsive - Show tooltips instantly
- Include command buttons
- Allow selection by category

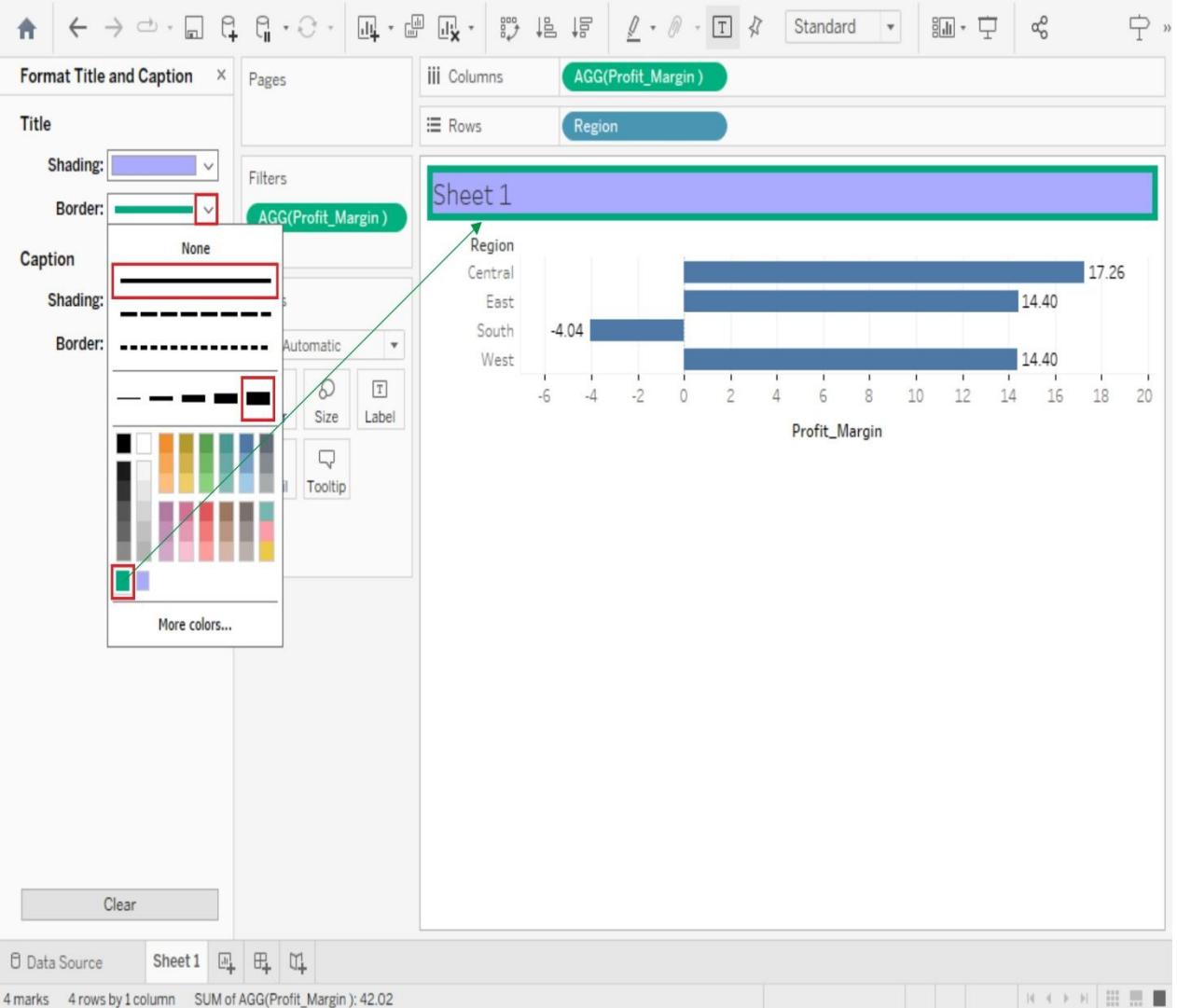
At the bottom of the dialog are 'Reset', 'Preview', 'OK', and 'Cancel' buttons.

3. Headers and Titles:

Format headers, titles, and subtitles for clarity and consistency. Use the Format pane or the Format menu to adjust text formatting, alignment, and shading.





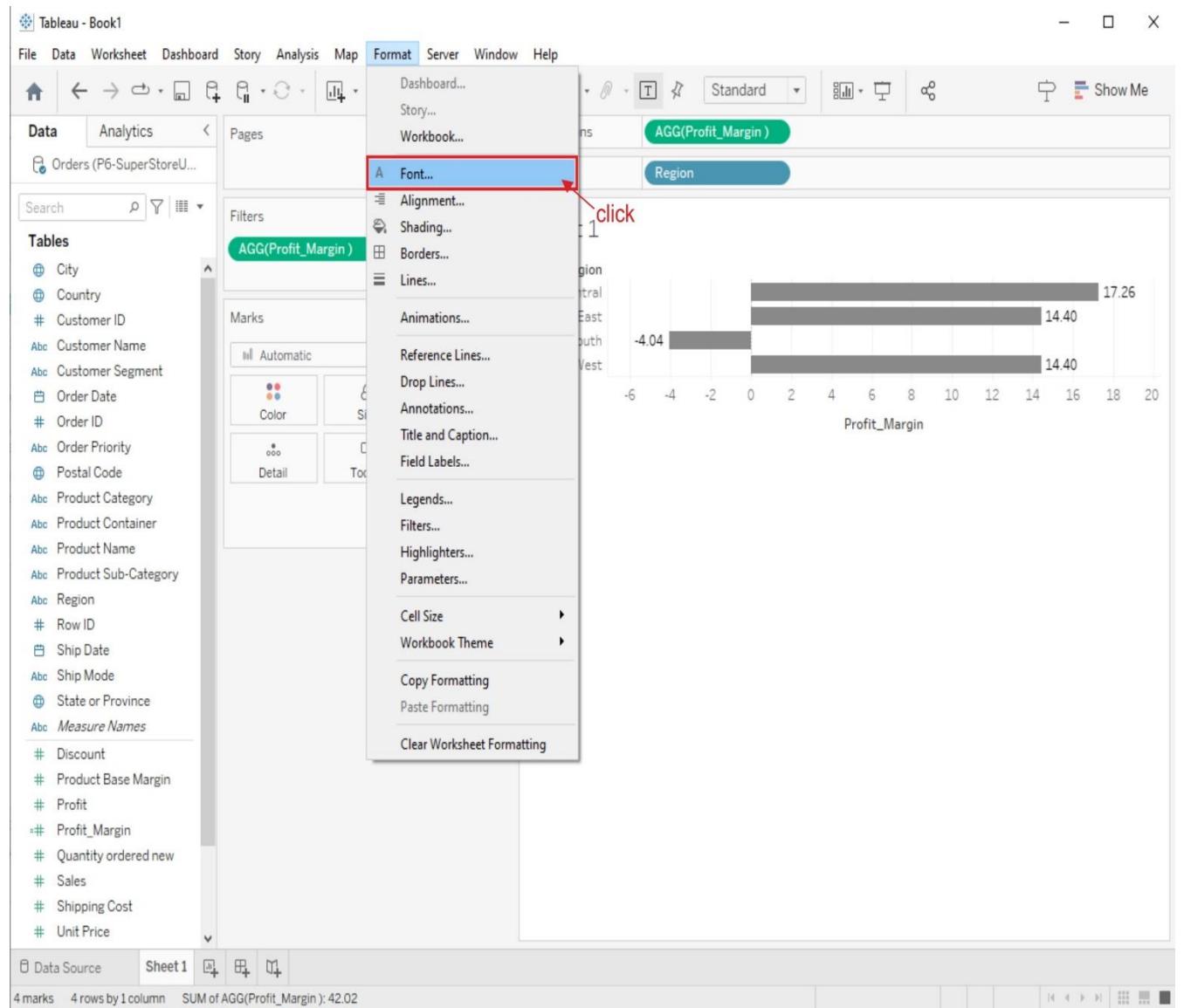


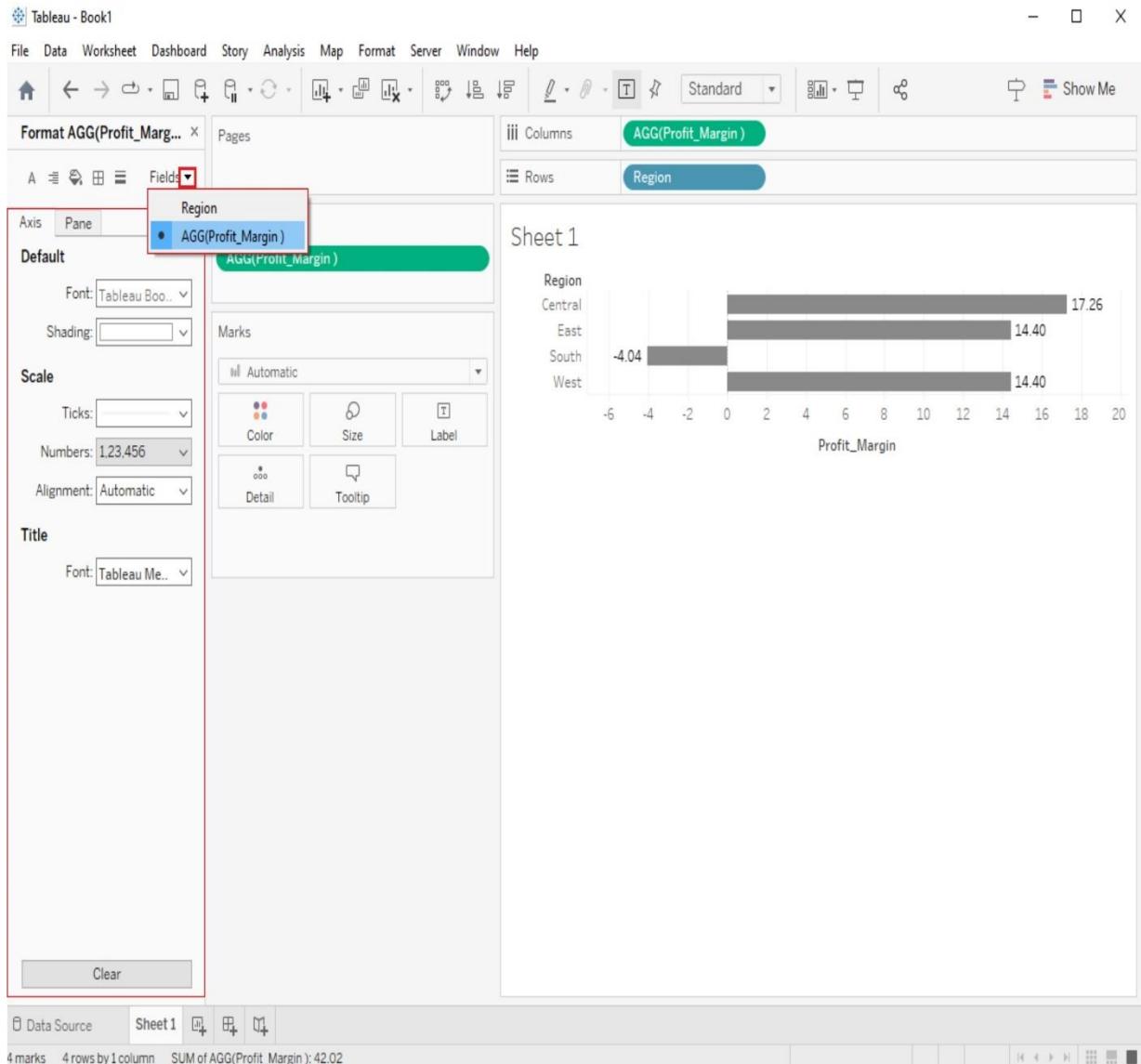
Aim:

Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.

Solution :

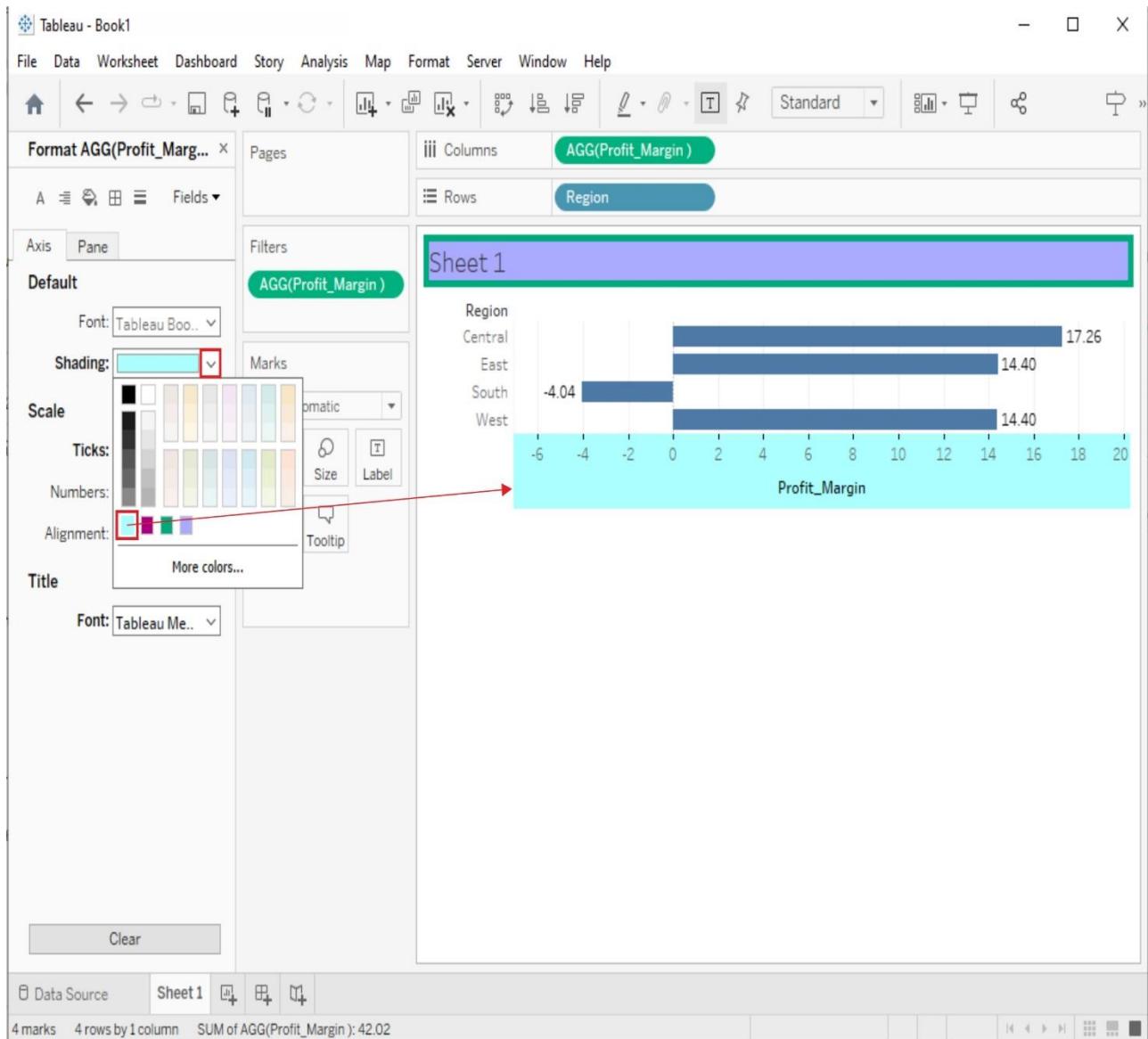
Editing and Formatting Axes:

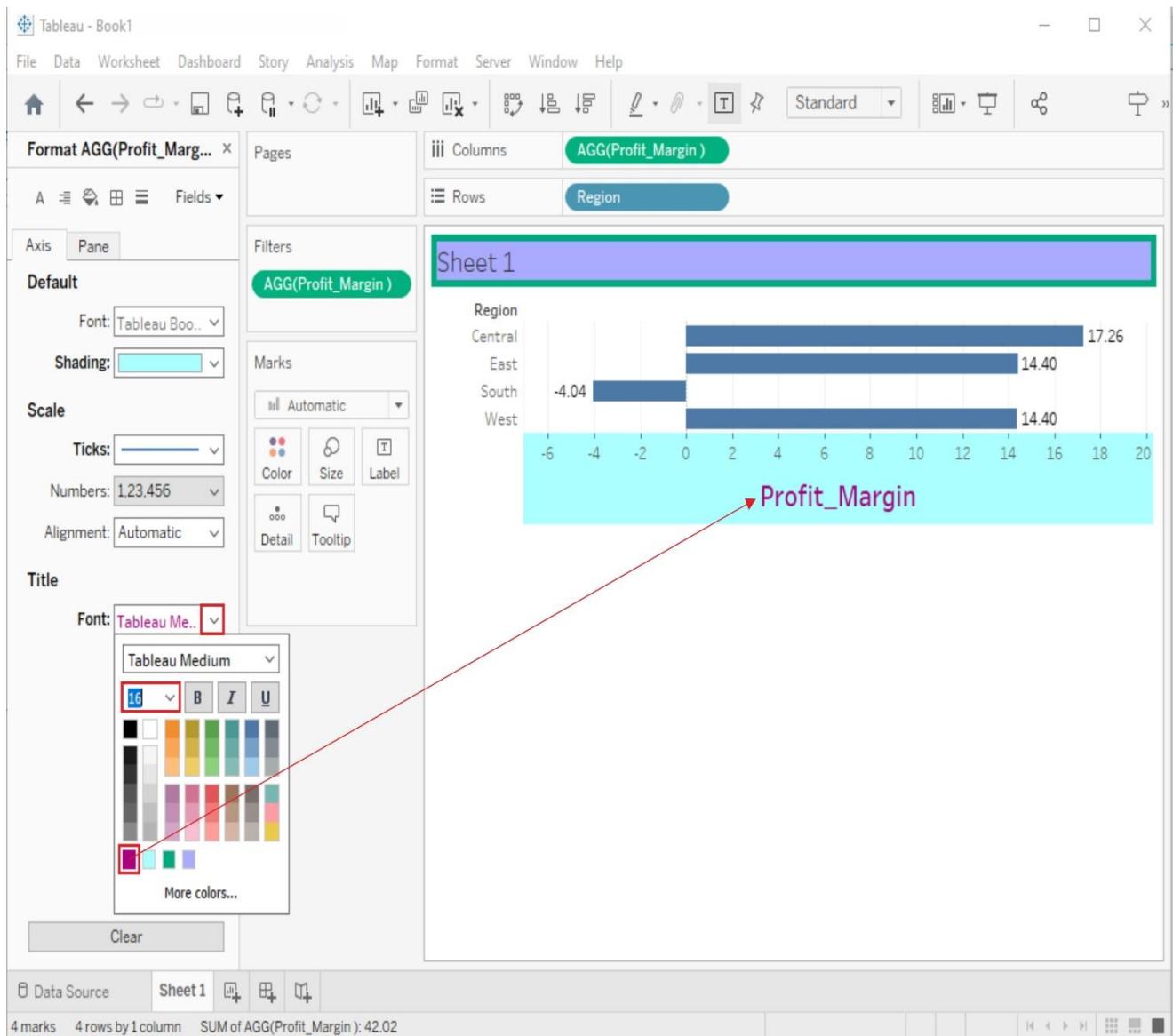




1. Edit Axis Title:

- Click on the axis title you want to edit.
- You can now modify the title text, font, size, color, and alignment using the Format pane or the toolbar at the top.





2. Edit Axis Labels:

- Right-click on an axis and select "Edit Axis."
- In the Edit Axis dialog box, you can change the formatting of labels, tick marks, and other axis-related properties.

3. Scale and Range:

- To change the scale or range of an axis, right-click on it and select "Edit Axis."
- In the dialog box, adjust the Minimum and Maximum values, scale, or range according to your needs.

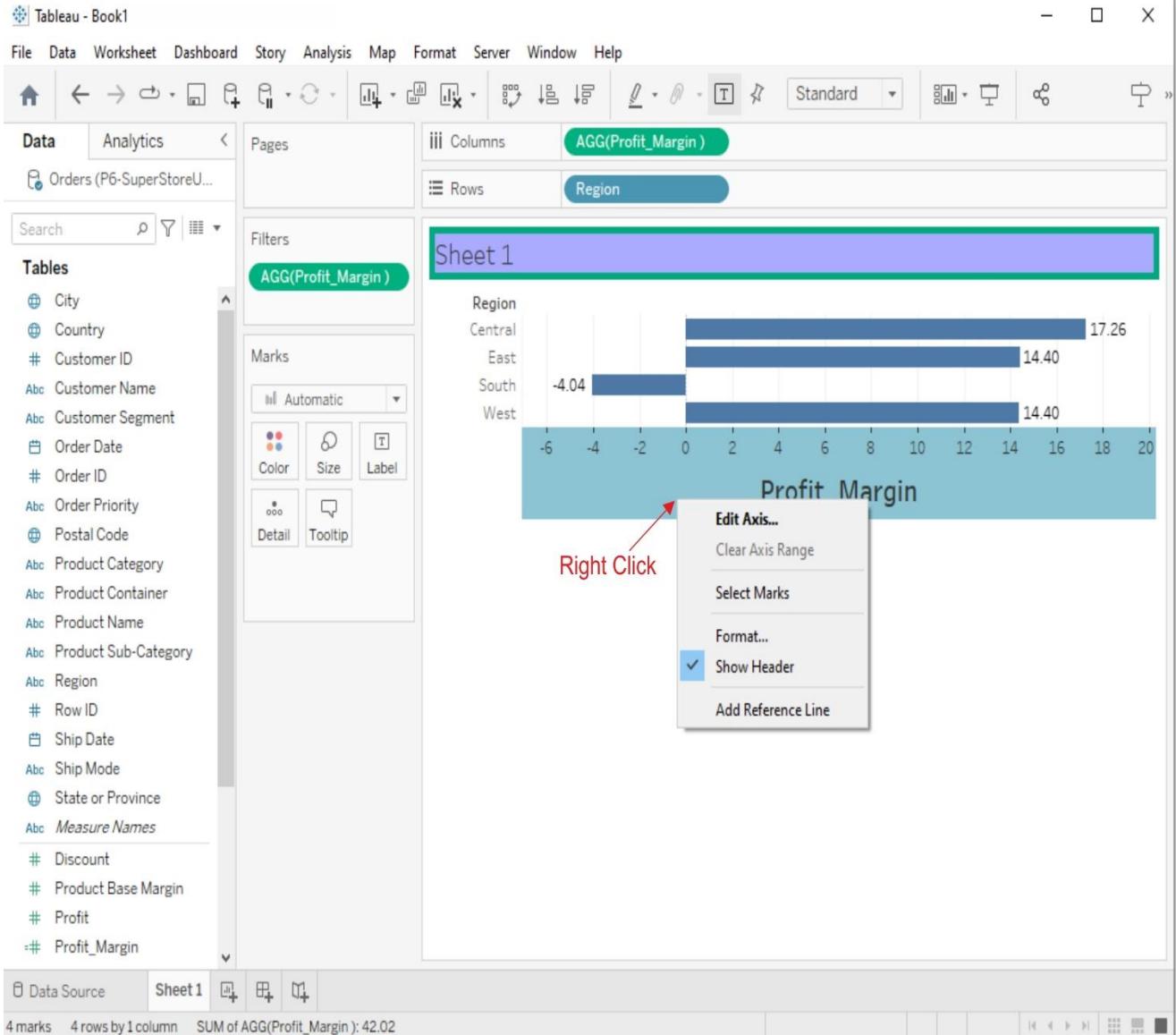


Tableau - Book1

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Format AGG(Profit_Margin)

A Fields ▾

Axis Pane

Default

Font: Tableau Boo.. ▾

Shading: ▾

Scale

Ticks: ▾

Numbers: 1.23,456 ▾

Alignment: Automatic ▾

Title

Font: Tableau Me.. ▾

Pages

Edit Axis [Profit Margin]

General Tick Marks

Range

Automatic Include zero

Uniform axis range for all rows or columns

Independent axis ranges for each row or column

Custom

Automatic Automatic

-7.076319382 20.295268707

Marks Color Size Detail Tool

Scale

Reversed

Logarithmic

Positive Symmetric

Axis Titles

Title Custom Profit Margin

Subtitle Subtitle Automatic

Reset

Clear

Data Source Sheet 1

4 marks 4 rows by 1 column SUM of AGG(Profit Margin): 42.02

Edit Axis [Profit_Margin]

X

General

Tick Marks

Major Tick Marks

- Automatic
- Fixed
- None

Tick origin

5

Tick interval

10

Minor Tick Marks

- Automatic
- Fixed
- None

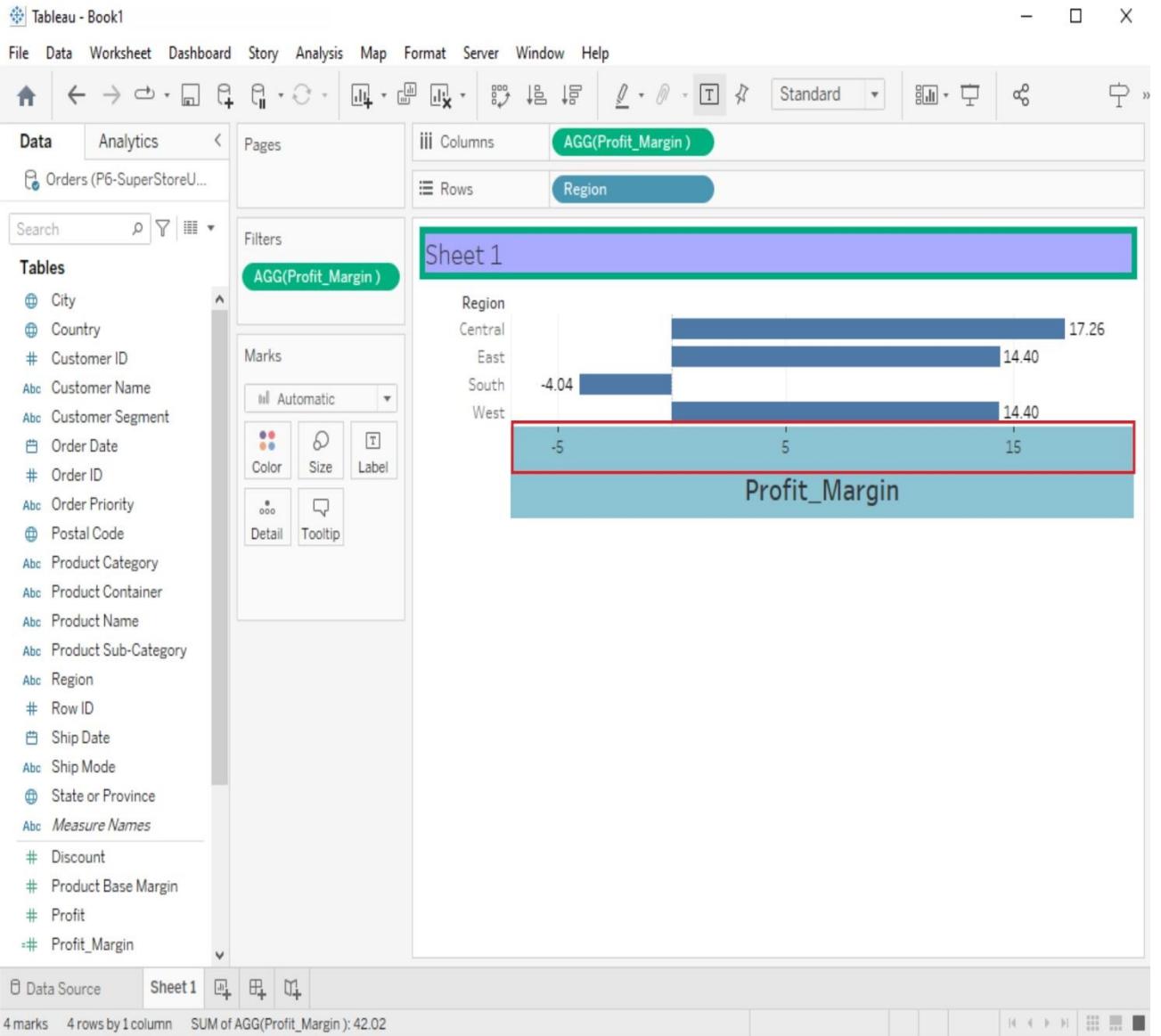
Tick origin

0

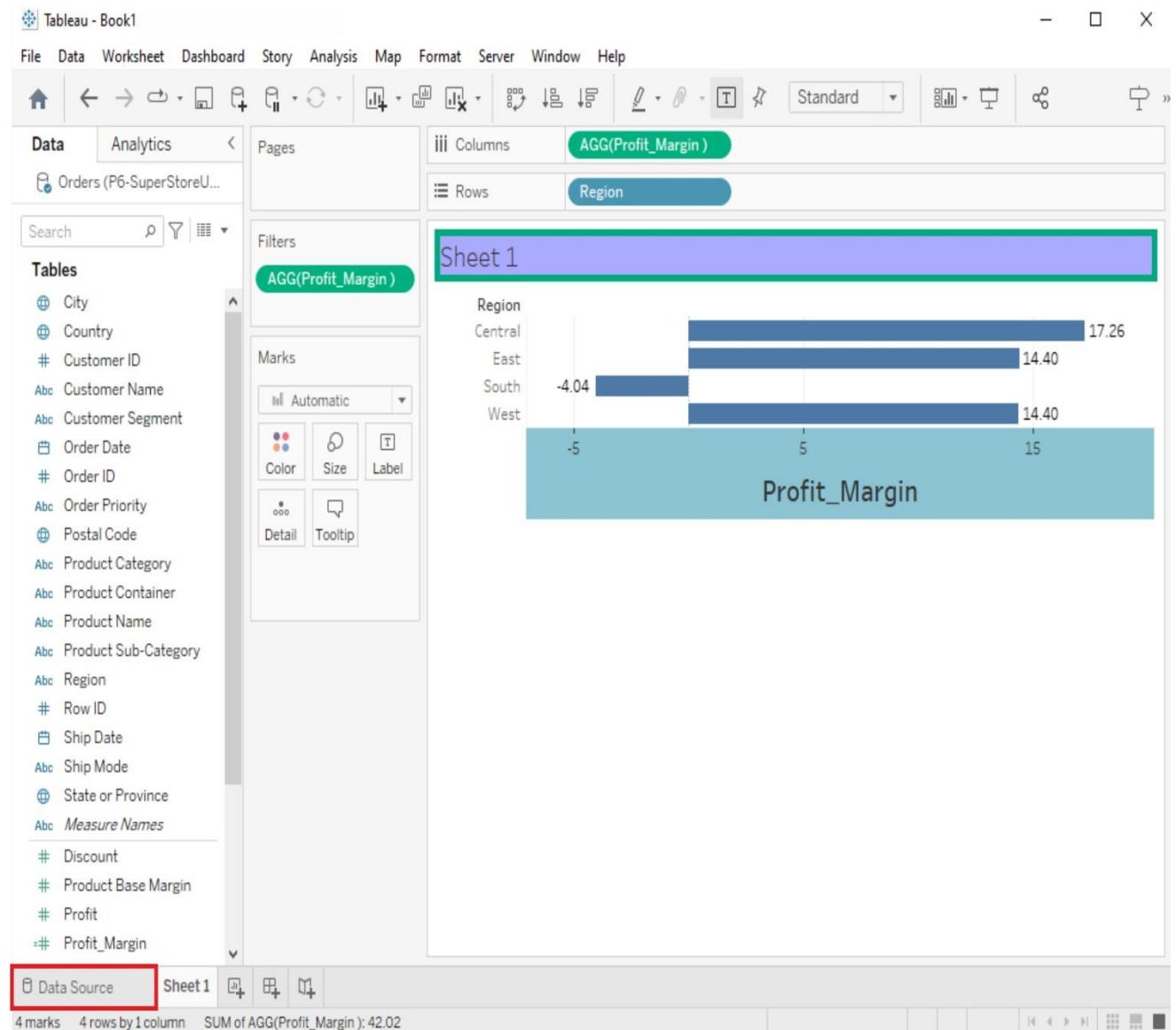
Tick interval

1

↺ Reset



Manipulating Data in Tableau data



Change Data Type

If Tableau has inferred a wrong data type for a column, the data type can be changed by clicking on the data type symbol in the column header

The screenshot shows the Tableau Data Source view for a connection named 'P6-SuperStoreUS-2015'. The 'Orders' sheet is selected. A context menu is open over the 'Discount' field in the data grid, with the 'Number (decimal)' option highlighted. Other options include Number (whole), Date & Time, Date, String, Boolean, and Default.

Row ID	Order Priority	Discount	Unit Price	Shipping Cost
495	Medium	0.090000	2.88	1.4900
18495	Medium	0.090000	2.88	1.4900
21103	Critical	0.090000	2.88	0.7000
20847	High	0.010000	2.84	0.9300
26241	Low	0.070000	2.12	1.9900

New Column(Calculated Fields)

Calculated fields can be used if you need to create customized logic for manipulating certain data types or data values. There are a large-range of functions available in Tableau that can be used individually or collectively for data manipulation

The screenshot shows the Tableau Data Source view for a connection named "P6-SuperStoreUS-2015". The "Orders" sheet is selected. A context menu is open over a field in the data grid, with the "Create Calculated Field..." option highlighted. The data grid displays the following schema:

#	Orders	Order Priority	Discount	Unit Price	Shipping Cost
8241	Low	0.070000	2.12	1.9900	
19314	Critical	0.050000	1.88	1.4900	
20698	Medium	0.060000	1.76	0.7000	
24319	Not Specified	0.020000	1.74	4.0800	
20632	High	0.020000	1.68	1.5700	

Tableau - Book1

File Data Server Window Help

Connections Add

P6-SuperStoreUS-2015 Microsoft Excel

Sheets

Use Data Interpreter
Data Interpreter might be able to clean your Microsoft Excel workbook.

Orders Returns Users

New Union

New Table Extension

Orders (P6-SuperStoreUS-2015)

Connection Live Extract

Filters 0 | Add

Orders

Profit_Margin

(SUM([Profit]) / SUM([Sales])) * 100

The calculation is valid.

OK

8241 Low 0.070000 2.12 1.9900

19314 Critical 0.050000 1.88 1.4900

20698 Medium 0.060000 1.76 0.7000

24319 Not Specified 0.020000 1.74 4.0800

20632 High 0.020000 1.68 1.5700

Orders Shipping Cost

Type Field Name Phys... Rem...
Discou... Orders Disco...

Data Source Sheet1

Tableau - Book1

File Data Server Window Help

Connections Add

P6-SuperStoreUS-2015 Microsoft Excel

Sheets

Use Data Interpreter
Data Interpreter might be able to clean your Microsoft Excel workbook.

Orders

Returns

Users

New Union

New Table Extension

Orders (P6-SuperStoreUS-2015)

Connection Live Extract Filters 0 | Add

Orders

Need more data?
Drag tables here to relate them. [Learn more](#)

Orders 26 fields 1952 rows 100 rows

Order ID	Order Date	Ship Date	Customer ID	Customer Name	Employee ID	Employee Name	Product ID	Product Name	Quantity Ordered	Unit Price	Profit	Order Status	Ship Mode	Profit Margin
86838	12-05-2015	13-05-2015	100000	Customer 1	100000	John Smith	100000	Product A	4	14.26	-0.71	Shipped	Standard	-4.98
86838	12-05-2015	13-05-2015	100001	Customer 2	100001	Anna Johnson	100001	Product B	7	22.23	-24.03	Shipped	Standard	-108.10
86838	12-05-2015	13-05-2015	100002	Customer 3	100002	Michael Brown	100002	Product C	4	13.99	-37.03	Shipped	Standard	-264.69
86836	12-02-2015	15-02-2015	100003	Customer 4	100003	Sarah Davis	100003	Product D	6	18.80	2.63	Shipped	Standard	13.99
89201	15-06-2015	16-06-2015	100004	Customer 5	100004	David Wilson	100004	Product E	18	53.10	24.31	Shipped	Standard	45.79
3397	22-06-2015	23-06-2015	100005	Customer 6	100005	Emily Clark	100005	Product F	17	47.31	-3.38	Shipped	Standard	-7.15
88205	22-06-2015	23-06-2015	100006	Customer 7	100006	James Green	100006	Product G	4	11.13	-2.70	Shipped	Standard	-24.30
89520	15-01-2015	16-01-2015	100007	Customer 8	100007	Laura Taylor	100007	Product H	2	5.50	-172.72	Shipped	Standard	-3,140.33

Data Source Sheet1   

Pivoting Tableau data

Data pivoting enables you to rearrange the columns and rows in a report so you can view data from different perspectives

The screenshot shows the Tableau Data Source interface for a connection named "P6-SuperStoreUS-2015". The left sidebar lists sheets: Orders, Returns, Users, New Union, and New Table Extension. The main area displays the "Orders" sheet with 26 fields and 1952 rows. A context menu is open over the "Order Priority" column header, with the "Pivot" option highlighted and surrounded by a red box.

>	# Orders	Abc Orders	Row ID	Order Priority	Shipping Cost	Customer ID	Abc Orders	Customer Name
20632	High				58	1.5700	24	Edna Thomas
24319	Not Specified				74	4.0800	129	Kara Allison
20698	Medium			Pivot	76	0.7000	56	Randall Montgomery
19314	Critical				38	1.4900	171	Christina Matthews
26241	Low			0.070000	2.12	1.9900	115	Dwight M Carr
8241	Low			0.070000	2.12	1.9900	117	Linda Weiss
20847	High			0.010000	2.84	0.9300	3	Bonnie Potter
495	Medium			0.090000	2.88	1.4900	102	Caroline Johnston

