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# Tableau 10

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# Performing Calculations in Tableau

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# What's In It For Me

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

- Understand what is a calculated field
- Understand how to build arithmetic calculations
- Understand how to create quick table calculations
- Understand how to work with aggregation options
- Understand how to build logic statements
- Understand how to include grand totals and subtotals

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# Performing Calculations in Tableau

Topic 1: Calculated Fields

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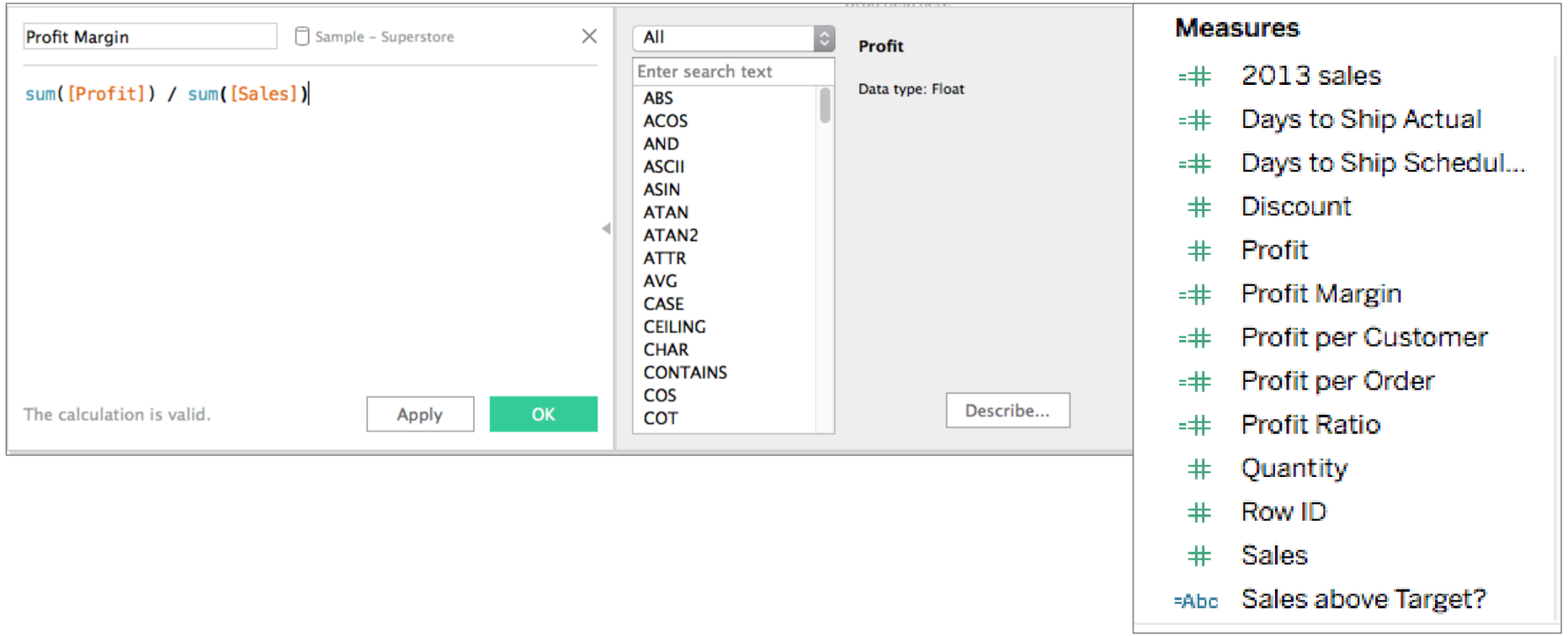
# What are Calculated Fields?

Calculated fields are formulas that reference fields in the dataset (or other calculated fields).

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# Using Calculated Fields

Calculated fields are useful when the data does not include all of the fields required to perform the analysis. It uses:

standard operators (plus, minus, multiply, divide)

functions (average, median, minimum, maximum)

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# Performing Calculations in Tableau

Topic 2: Building a Calculated Field

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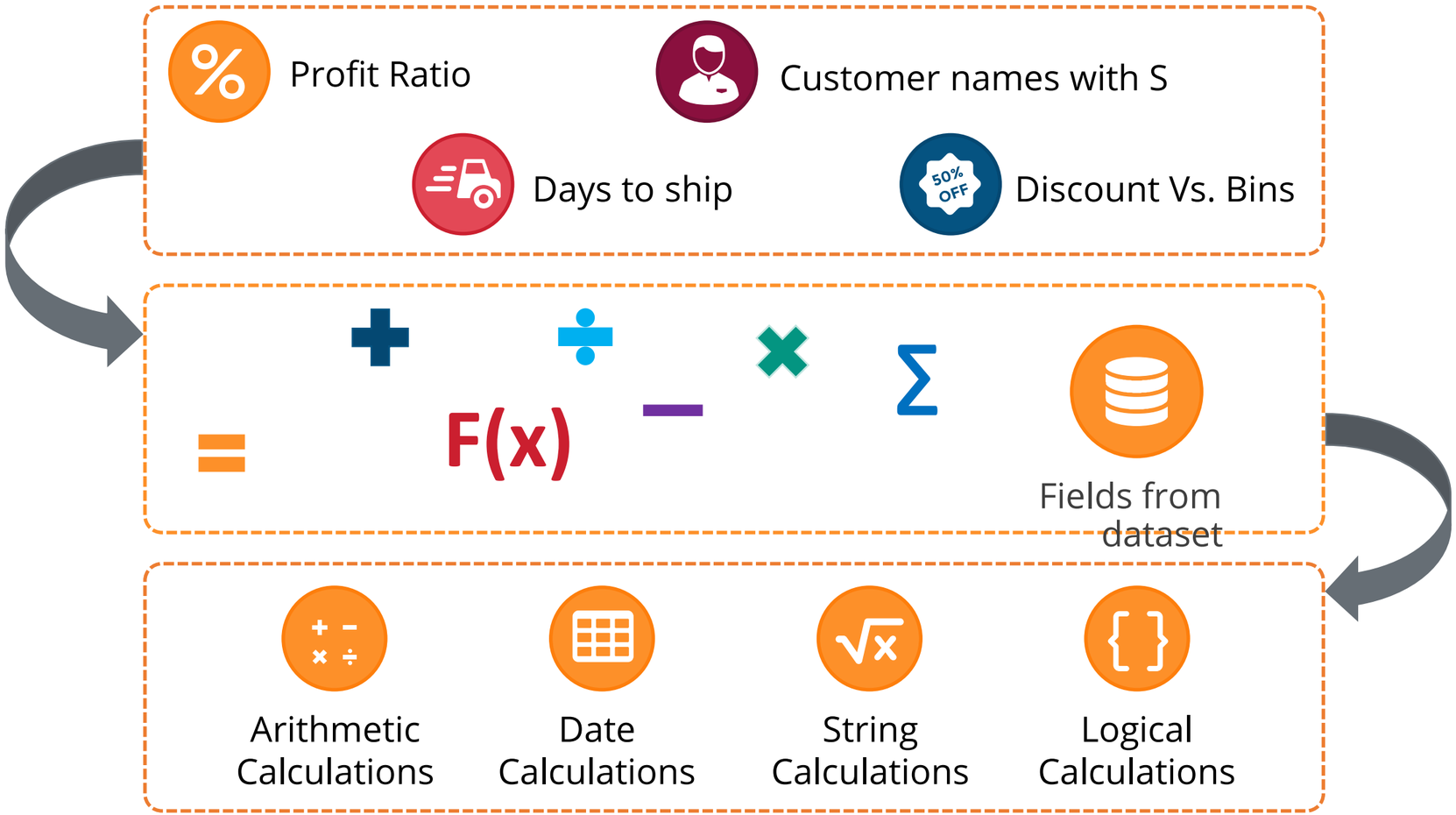
# Building a Calculated Field

## TYPES OF CALCULATIONS

Tableau makes it possible to create new fields that are not present in your underlying data set.

Calculated fields are based on a formula defined by standard functions and operators along with existing fields from your dataset.




These fields from the dataset can be based on different types of calculations.

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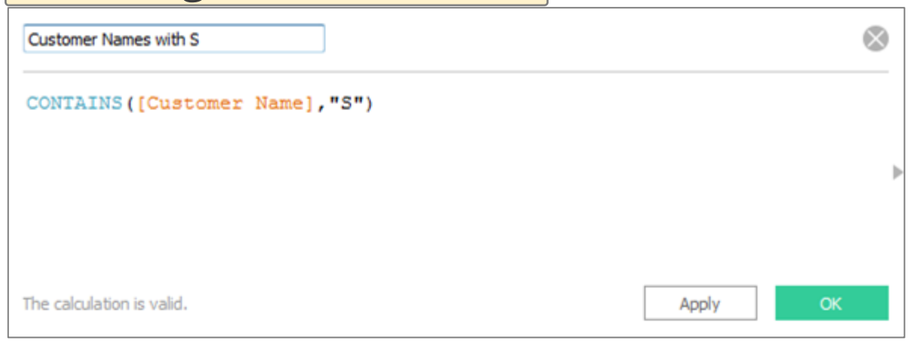
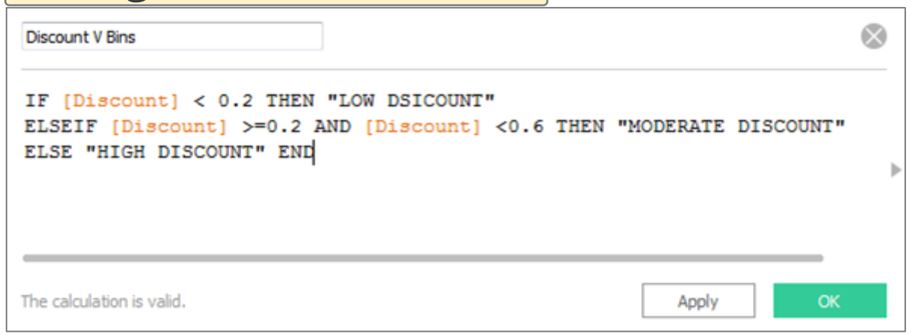
# Building a Calculated Field

## TYPES OF CALCULATIONS

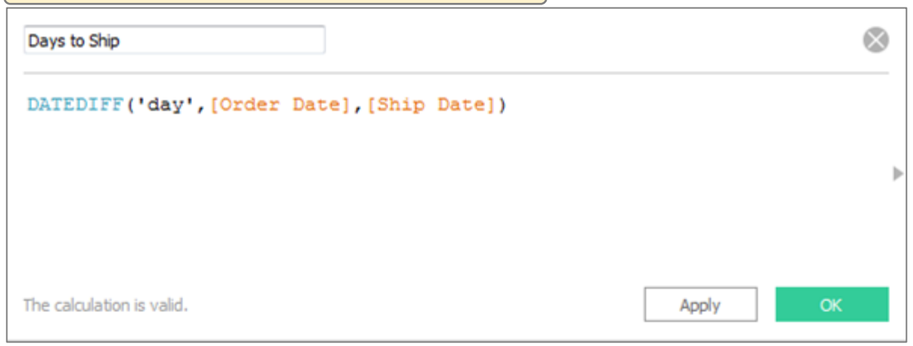
### String Calculations



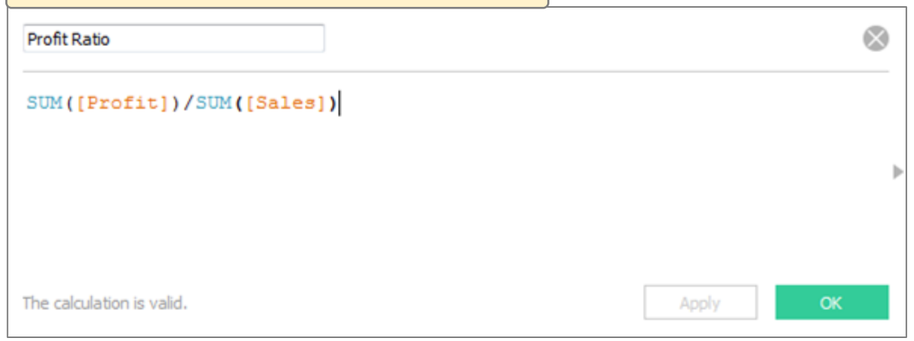

### Logical Calculations




### Date Calculations




### Arithmetic Calculations

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# Use Case 1

Schemes and Promotions offer retail stores a series of benefits and aids to increase sales. Genelia's next project is from a Retail store.

Michael Clint, the store manager of a retail store, plans to launch a new discount and pricing scheme.

For this, he wants to analyze the total expenses for each product sub-category across all the years to strategize a sales promotion scheme.

Let's understand how Genelia did this through a demonstration!

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## Demo—Building a Calculated Field

Demonstrate how to create a calculated field using sales and profit to calculate the total expenses and create a text table with order date at year level, sub-category, and total expenses.

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# Performing Calculations in Tableau

Topic 3: Create Quick Table Calculations

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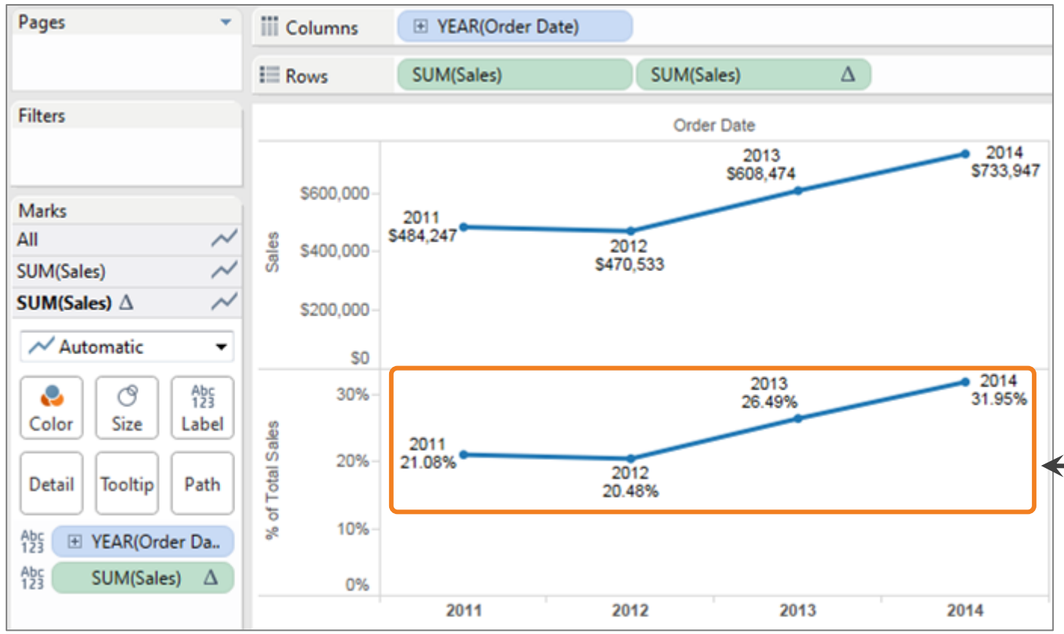
# Creating Quick Table Calculations

## INTRODUCTION

While Calculated Fields are created by the user, Quick table calculations are a set of pre-defined functions that the user can apply at the view level.




Percent to Total table calculation

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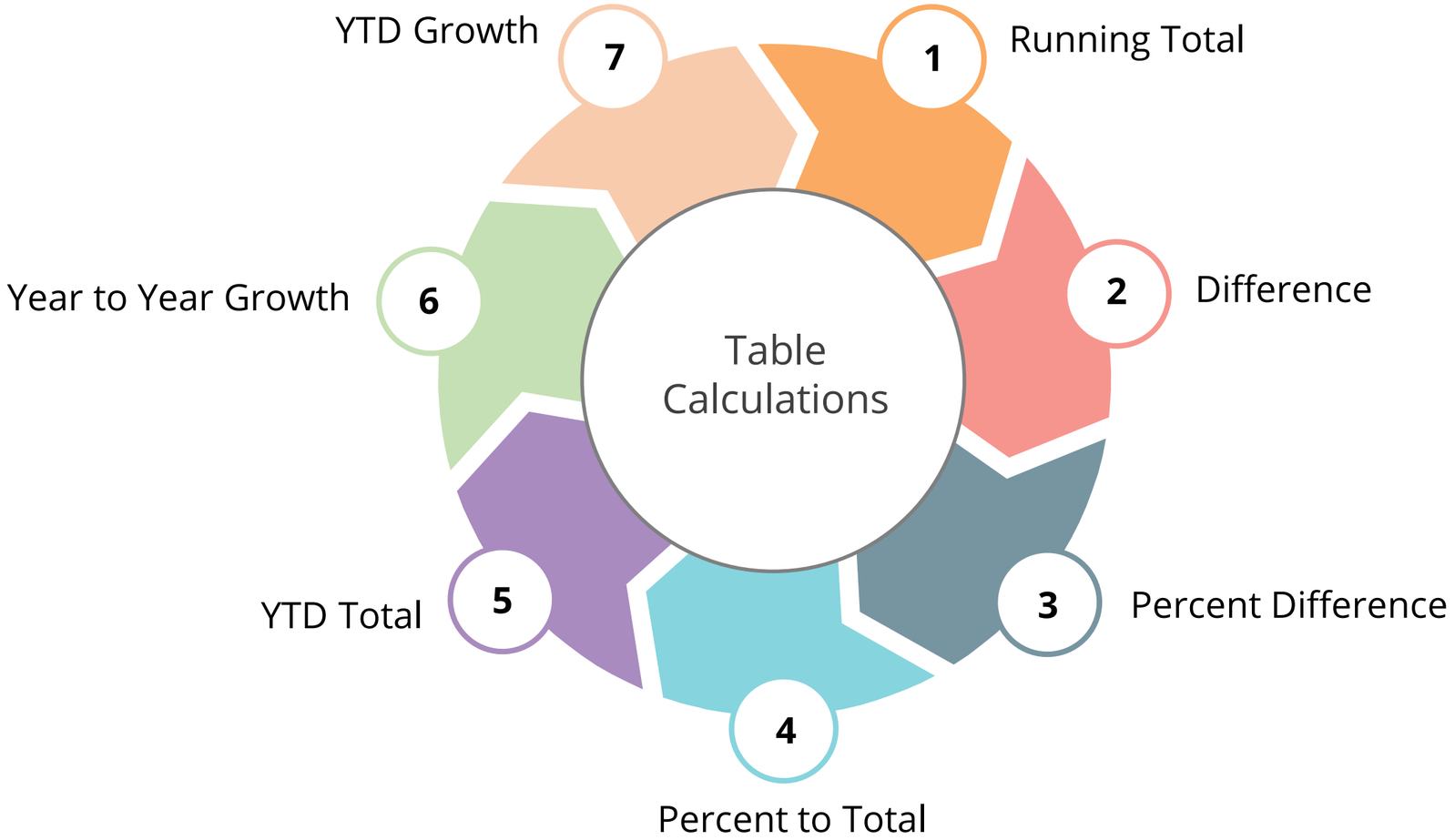
# Creating Quick Table Calculations

## IN-BUILT FUNCTIONS

Some of the built-in Tableau functions to perform Quick Table Calculations are:

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## Demo—Working with Quick Table Calculations

Demonstrate how to create a line chart with sales by order date at yearly level, drill down from year to quarter, create and add table calculation for difference, and pivot the sales pill from the Rows shelf to the color shelf in the Marks card.

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# Performing Calculations in Tableau

Topic 4: Aggregation Options

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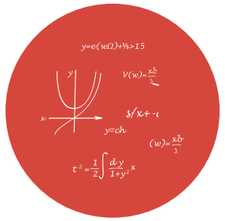
# Aggregation Options

## INTRODUCTION

Calculated fields and Quick Table calculations utilize different types of aggregations, such as “Sum of Sales” or “Average of Profit.”



Aggregation functions are mathematical functions used to produce aggregated data.

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# Aggregation Options

## FUNCTIONS

Tableau provides the following aggregation functions:

- Attribute
- Dimension
- Sum
- Average
- Median
- Count
- Count (distinct)
- Minimum
- Maximum
- Std.Dev
- Std.Dev (Pop)
- Variance
- Variance (Pop)
- Disaggregate

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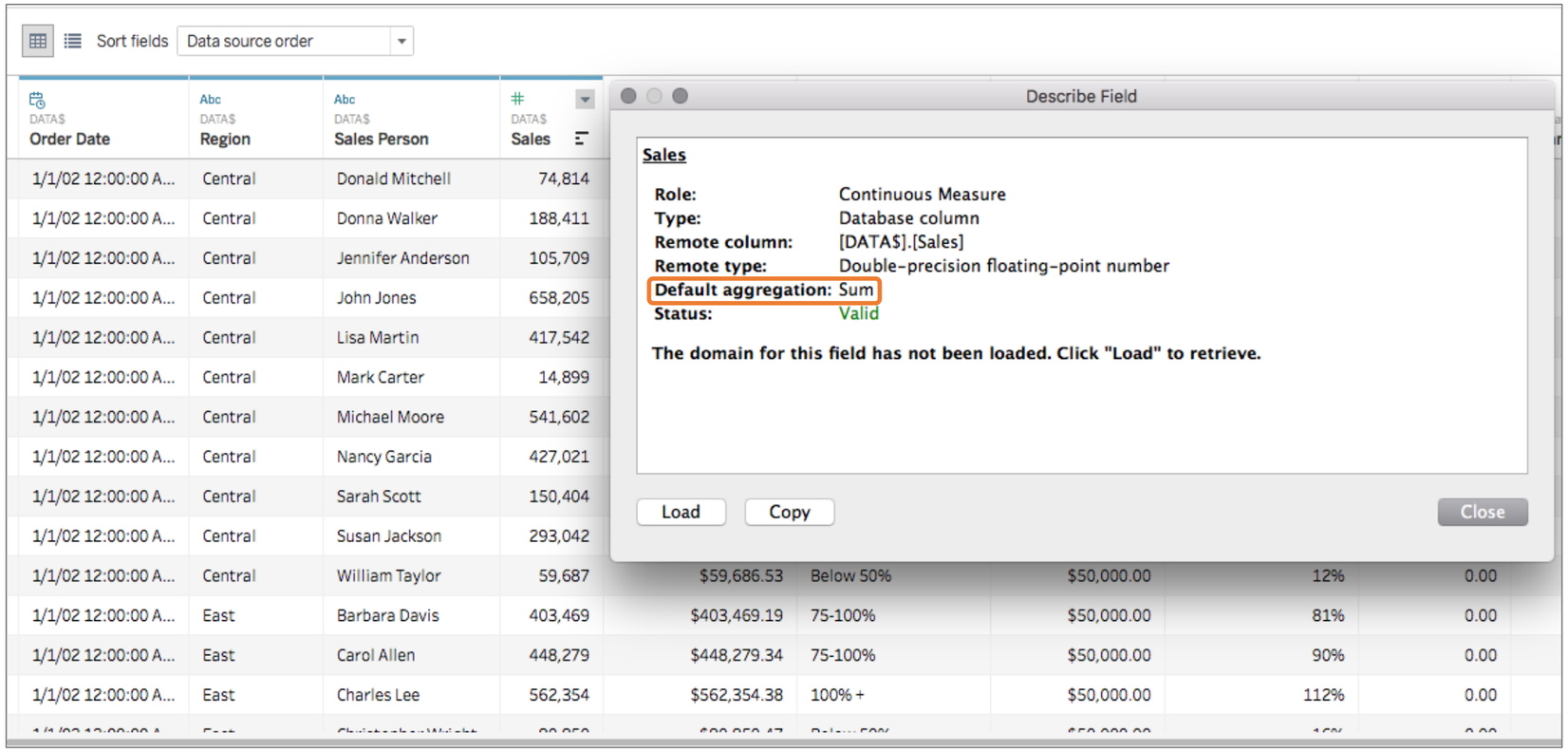
# Aggregation Options

## MEASURES

Tableau automatically aggregates its values for measures. Each Measure has a default aggregation.

The current aggregation is included in the measure's name in the view.

Example: **Sales** becomes **SUM(Sales)**

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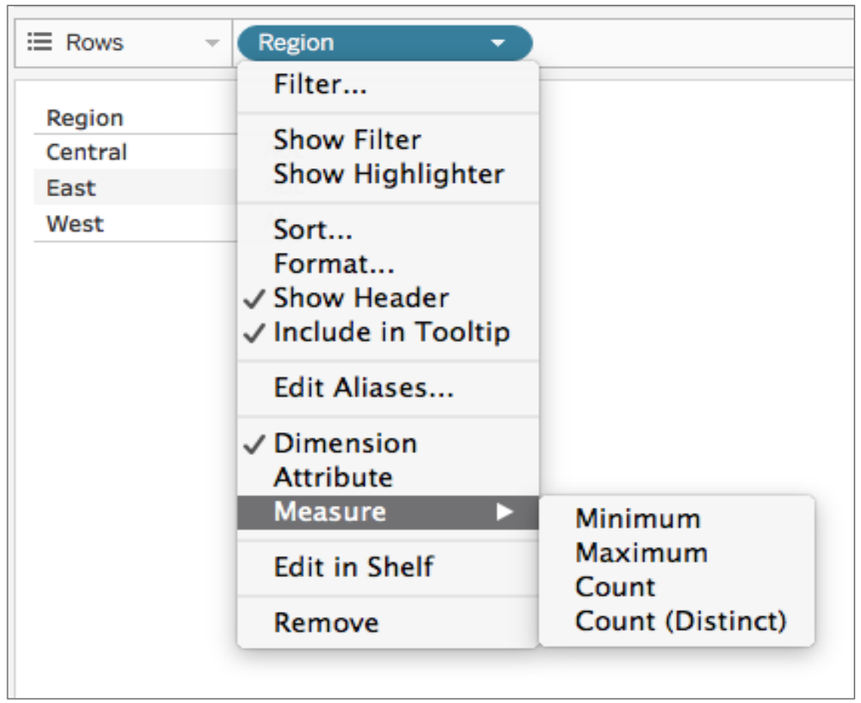
# Aggregation Options

## DIMENSIONS

Aggregating dimensions create a Measure field (for example, **Product ID** becomes **Count of Product ID**).

Dimensions can be aggregated with Maximum, Minimum, Count, and Count (Distinct).




Count (Distinct) is not supported in Microsoft Excel, Microsoft Access, or text files.

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# Performing Calculations in Tableau

Topic 5: Logic Statements

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# Logic Statements

Logic statements are incorporated into calculated fields to perform logical tests and return appropriate results.

**Example -**

grouping customers by Age

```
IF [Age] <21 then “Under 21”
ELSEIF [Age] <40 then “21-39”
ELSEIF [Age] <60 then “40-59”
ELSE “Over 60”
```

**Logic statements in Tableau:**

CASE
IF
IFNULL
ISDATE
ISNULL

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# Logic Statements

Case Statement

IF Statement

IFNULL Statement

ISDATE Statement

ISNULL Statement

## CASE STATEMENT

**CASE** statement evaluates an expression, compares it to a sequence of values, and returns a result; it is typically more concise than IF statements.

**SYNTAX** - CASE expression WHEN value1 THEN return1 WHEN value2 THEN return2…ELSE default return END

**EXAMPLE** - CASE [Region] WHEN “South” THEN 1 WHEN “West” then 2 ELSE 3 END

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# Logic Statements

Case Statement

IF Statement

IFNULL Statement

ISDATE Statement

ISNULL Statement

## IF STATEMENTS

**IF** statement evaluates a sequence of test conditions and returns ~~for~~ the value for the first condition that is true.

**SYNTAX** - IF test1 THEN value1 ELSEIF test2 THEN value2 ELSE else END

**EXAMPLE** - IF [Region]=”West” then 1 ELSEIF [Region]=”South” THEN 2 ELSE 3 END

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# Logic Statements

Case Statement

IF Statement

IFNULL Statement

ISDATE Statement

ISNULL Statement

## IFNULL STATEMENTS

**IFNULL** statement returns the first expression if the result is not null and returns the second expression if it is null.

**SYNTAX** - IFNULL(expression1, expression2)

**EXAMPLE** - IFNULL([Category],[Sub-Category])

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# Logic Statements

Case Statement

IF Statement

IFNULL Statement

ISDATE Statement

ISNULL Statement

## ISDATE STATEMENTS

**ISDATE** statement returns TRUE if the field can be converted to a date and returns FALSE if the field cannot be converted to a date.

**SYNTAX** - ISDATE(string)

**EXAMPLE** - ISDATE(“December 25, 2017”)=TRUE

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# Logic Statements

## ISNULL STATEMENTS

- Case Statement
- IF Statement
- IFNULL Statement
- ISDATE Statement
- ISNULL Statement

**ISNULL** statement returns TRUE if the field is null and returns FALSE if it is not.

**SYNTAX** - ISNULL(expression)

**EXAMPLE** - ISNULL([Region])=FALSE

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# Performing Calculations in Tableau

## Topic 6: Adding Grand Totals and Subtotals

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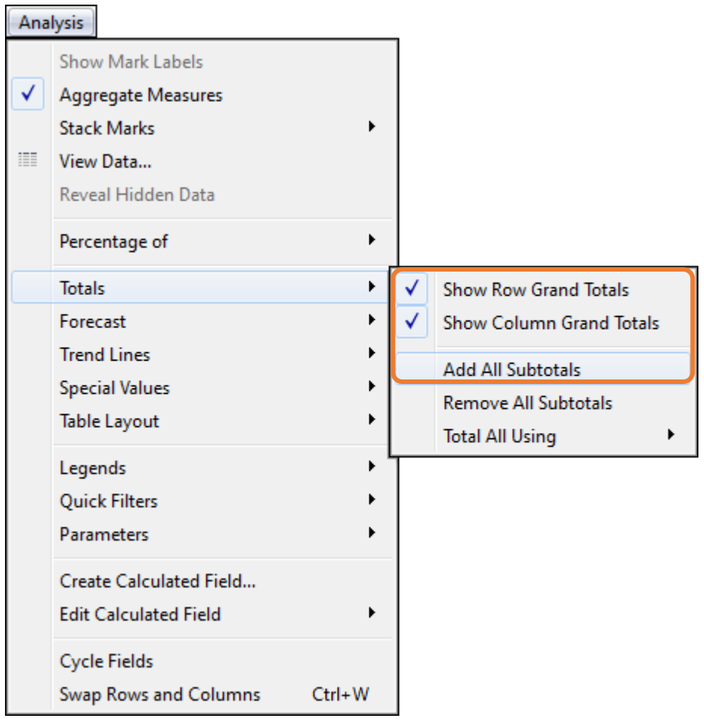
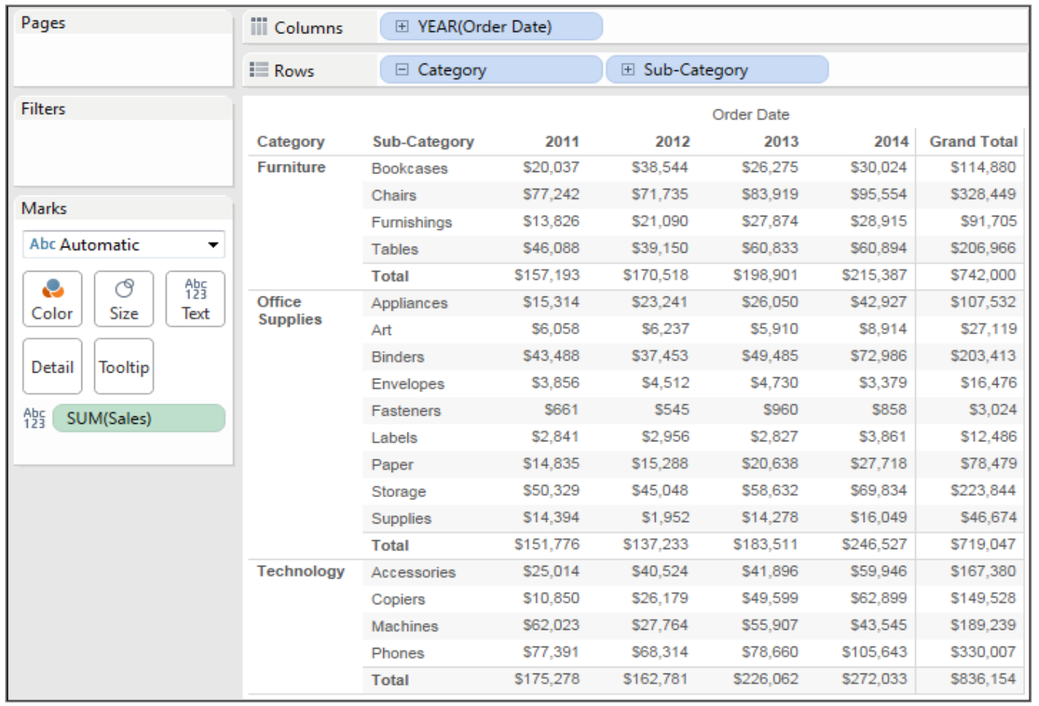
# Calculating Grand Totals and Subtotals

Once you have a complete set of data, including the fields from the data set, Calculated Fields, and Quick Table Calculations, you can add Grand Totals and Sub-totals to your view to present the aggregation of that data.




Order Date

| Category | Sub-Category | 2011 | 2012 | 2013 | 2014 | Grand Total |
|---|---|---|---|---|---|---|
| Furniture | Bookcases | $20,037 | $38,544 | $26,275 | $30,024 | $114,880 |
| | Chairs | $77,242 | $71,735 | $83,919 | $95,554 | $328,449 |
| | Furnishings | $13,826 | $21,090 | $27,874 | $28,915 | $91,705 |
| | Tables | $46,088 | $39,150 | $60,833 | $60,894 | $206,966 |
| | Total | $157,193 | $170,518 | $198,901 | $215,387 | $742,000 |
| Office Supplies | Appliances | $15,314 | $23,241 | $26,050 | $42,927 | $107,532 |
| | Art | $6,058 | $6,237 | $5,910 | $8,914 | $27,119 |
| | Binders | $43,488 | $37,453 | $49,485 | $72,986 | $203,413 |
| | Envelopes | $3,856 | $4,512 | $4,730 | $3,379 | $16,476 |
| | Fasteners | $661 | $545 | $960 | $858 | $3,024 |
| | Labels | $2,841 | $2,956 | $2,827 | $3,861 | $12,486 |
| | Paper | $14,835 | $15,288 | $20,638 | $27,718 | $78,479 |
| | Storage | $50,329 | $45,048 | $58,632 | $69,834 | $223,844 |
| | Supplies | $14,394 | $1,952 | $14,278 | $16,049 | $46,674 |
| | Total | $151,776 | $137,233 | $183,511 | $246,527 | $719,047 |
| Technology | Accessories | $25,014 | $40,524 | $41,896 | $59,946 | $167,380 |
| | Copiers | $10,850 | $26,179 | $49,599 | $62,899 | $149,528 |
| | Machines | $62,023 | $27,764 | $55,907 | $43,545 | $189,239 |
| | Phones | $77,391 | $68,314 | $78,660 | $105,643 | $330,007 |
| | Total | $175,278 | $162,781 | $226,062 | $272,033 | $836,154 |

Grid displaying subtotals and grand totals

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## Demo—Adding Grand Totals and Subtotals

Demonstrate how to add grand totals to rows and columns, change the placements of grand totals, add and remove sub-totals

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# Use Case 2

To ensure her company's sustainability, Genelia needs to identify business growth opportunities.

For this, she needs to determine and study the sales variance for year-over-year growth based on the quarterly breakdown.

How can she do that?

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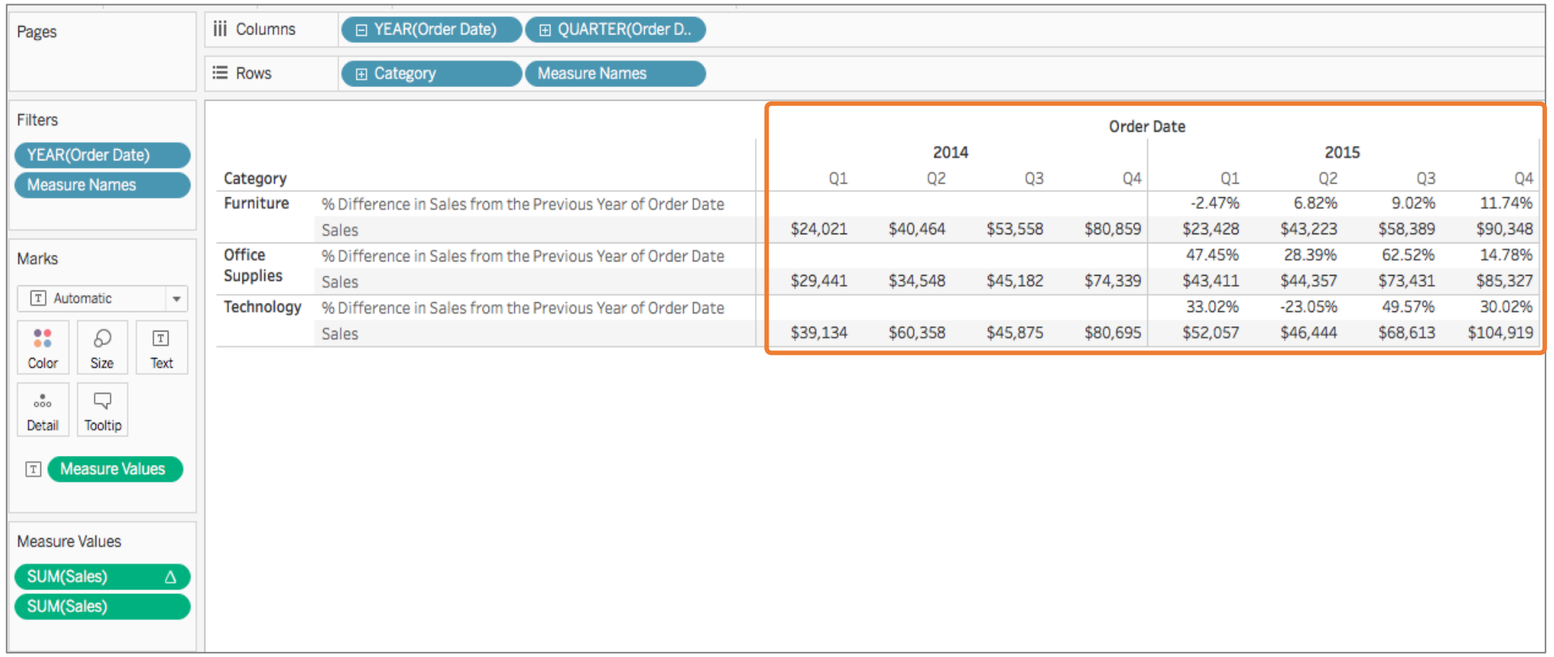
# Use Case 2: Solution

Genelia used a Quick Table calculation to compare quarter-over-quarter growth rates for the three product categories.




| | | Order Date | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2014 | | | | 2015 | | | |
| Category | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Furniture | % Difference in Sales from the Previous Year of Order Date | | | | | -2.47% | 6.82% | 9.02% | 11.74% |
| | Sales | $24,021 | $40,464 | $53,558 | $80,859 | $23,428 | $43,223 | $58,389 | $90,348 |
| Office Supplies | % Difference in Sales from the Previous Year of Order Date | | | | | 47.45% | 28.39% | 62.52% | 14.78% |
| | Sales | $29,441 | $34,548 | $45,182 | $74,339 | $43,411 | $44,357 | $73,431 | $85,327 |
| Technology | % Difference in Sales from the Previous Year of Order Date | | | | | 33.02% | -23.05% | 49.57% | 30.02% |
| | Sales | $39,134 | $60,358 | $45,875 | $80,695 | $52,057 | $46,444 | $68,613 | $104,919 |

Based on this analysis, she sees that Office Supply products sales grew substantially from Q3-2014 to Q3-2015 (62.52%), but in the following quarter (Q4-2015), Office Supply sales only grew 14.78% compared to Q4-2014.

She could use this data to investigate what drove the high growth rate in Q3 and the more modest growth rate in Q4.

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# Quiz

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**QUIZ**
1

Calculated fields cannot be based on _____.

a. calculated fields

b. groups

c. sets

d. geographic dimensions

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**QUIZ**
1

Calculated fields cannot be based on _____.

a. calculated fields

b. groups

c. sets

d. geographic dimensions

The correct answer is **b.**

Calculated fields cannot be based on groups.

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**QUIZ**
2

Which of the following aggregation functions can be applied to dimensions?

a. Attr

b. Std. Dev

c. Variance

d. Median

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**QUIZ**
2

Which of the following aggregation functions can be applied to dimensions?

a. Attr

b. Std. Dev

c. Variance

d. Median

The correct answer is **a.**

The Attr aggregation function can be applied to dimensions. It returns the value of the given expression if it only has a single value for all rows in the group; otherwise, it displays an asterisk (*) character.

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**QUIZ**
3

What are calculations created by editing fields on shelves in the view called?

a. Custom Split

b. Ad-hoc calculation

c. LOD calculation

d. Table calculation

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**QUIZ**
3

What are calculations created by editing fields on shelves in the view called?

a. Custom Split

b. Ad-hoc calculation

c. LOD calculation

d. Table calculation

The correct answer is **b.**

Calculations created by editing fields on shelves in the view are called ad-hoc calculations.

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**QUIZ**
4

What aggregation is not compatible with an Excel, Access, or text file data source?

a. Maximum

b. Minimum

c. Count

d. Count (Distinct)

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**QUIZ**
4

What aggregation is not compatible with an Excel, Access, or text file data source?

a. Maximum

b. Minimum

c. Count

d. Count (Distinct)

The correct answer is **d.**

The Count (Distinct) aggregation is not compatible with Excel, Access, or text file data sources. This is a major shortcoming of Excel pivot tables.

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**QUIZ**
5

Row totals may be _____:

a. Placed to the right of the row

b. Placed to the left of the row

c. Totalled using Sum, Average, Minimum, and Maximum

d. All of the above

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**QUIZ**
5

Row totals may be _____:

a. Placed to the right of the row

b. Placed to the left of the row

c. Totalled using Sum, Average, Minimum, and Maximum

d. All of the above

The correct answer is **d.**

Row totals can be placed to the right of the row, which is the default, or to the left of the row. The totals can be computed as a Sum, Average, Minimum, or Maximum.

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# Guided Exercises

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# Guided Exercise 1—Problem Statement

The Directors of a retail company want to analyze the percent to total contribution of each month against the total revenue. For this, they need to analyze the percent to total of the running sum of sales across time. Create a visualization to answer the following questions:

- What was the Technology category's percentage contribution to total sales in December 2013?
- In which month did the company cross 50% of the total sales?

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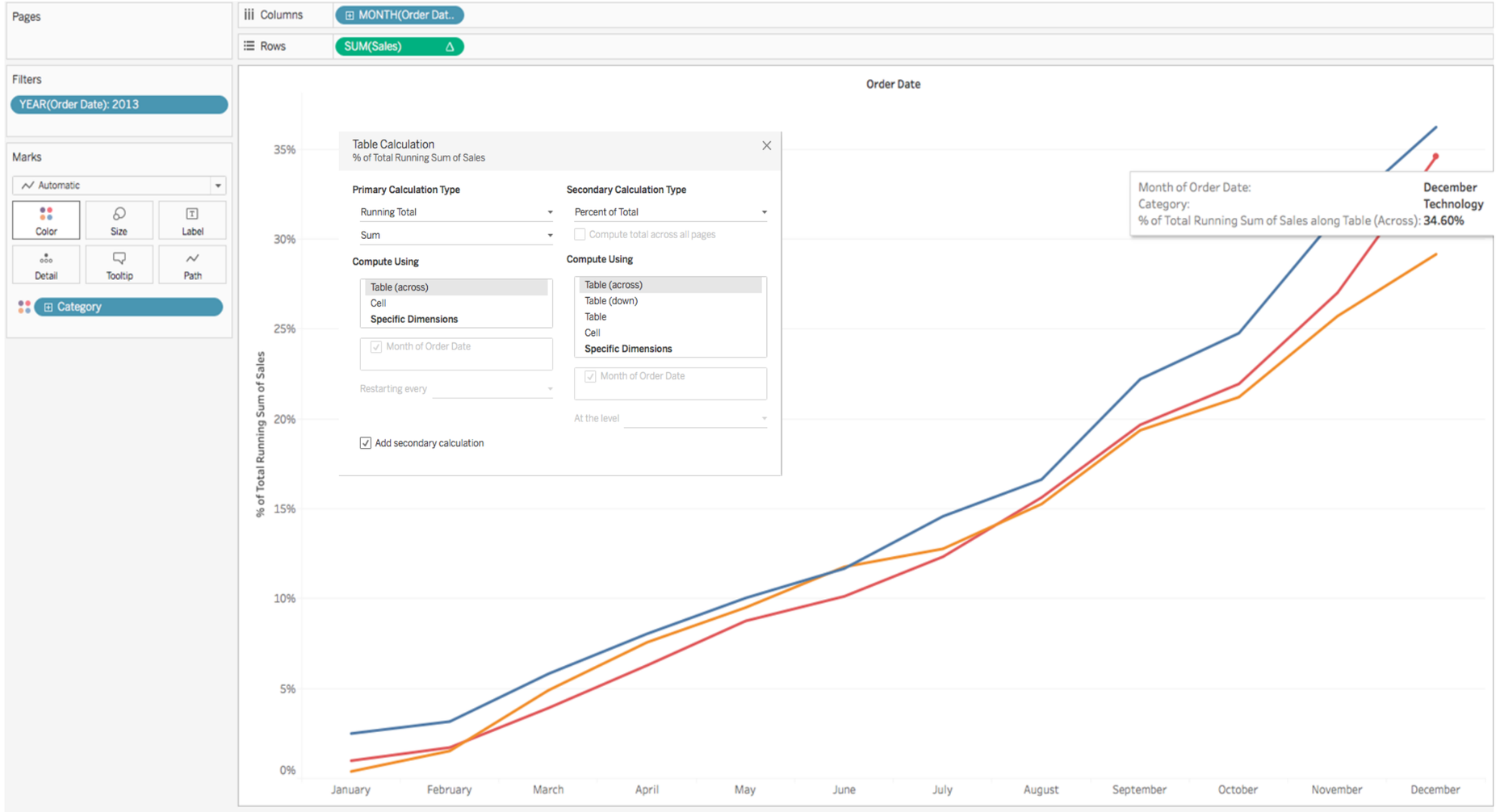
# Guided Exercise 1—Solution

The Technology Category's contribution to the running sum of sales was 34.60% in December.

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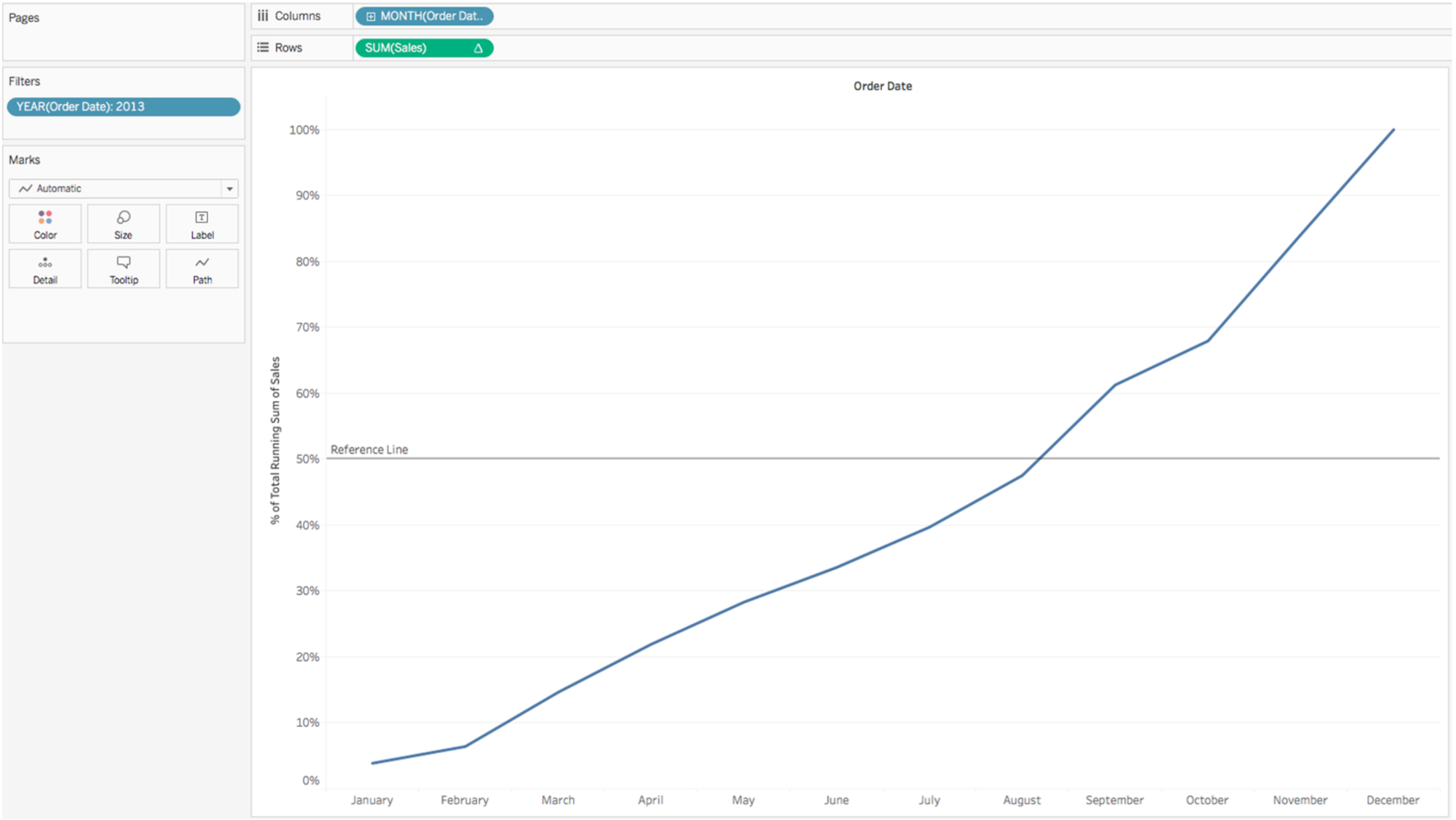
# Guided Exercise 1—Solution

The company achieved 50% of sales for the year in August

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# Guided Exercise 2—Problem Statement

Mark Anthony, the regional manager of a retail chain, needs to strategize a reward program scheme for regions with high performance. For this, he needs to analyze each state's sales contribution to the total sales within its respective region. Create a visualization to arrive at the answers to the following questions:

- Which is the highest performing state in the Central Region?
- What is New York and New Jersey's contribution to the total sales of the East region?

  (Hint - Create a group for New York and New Jersey)

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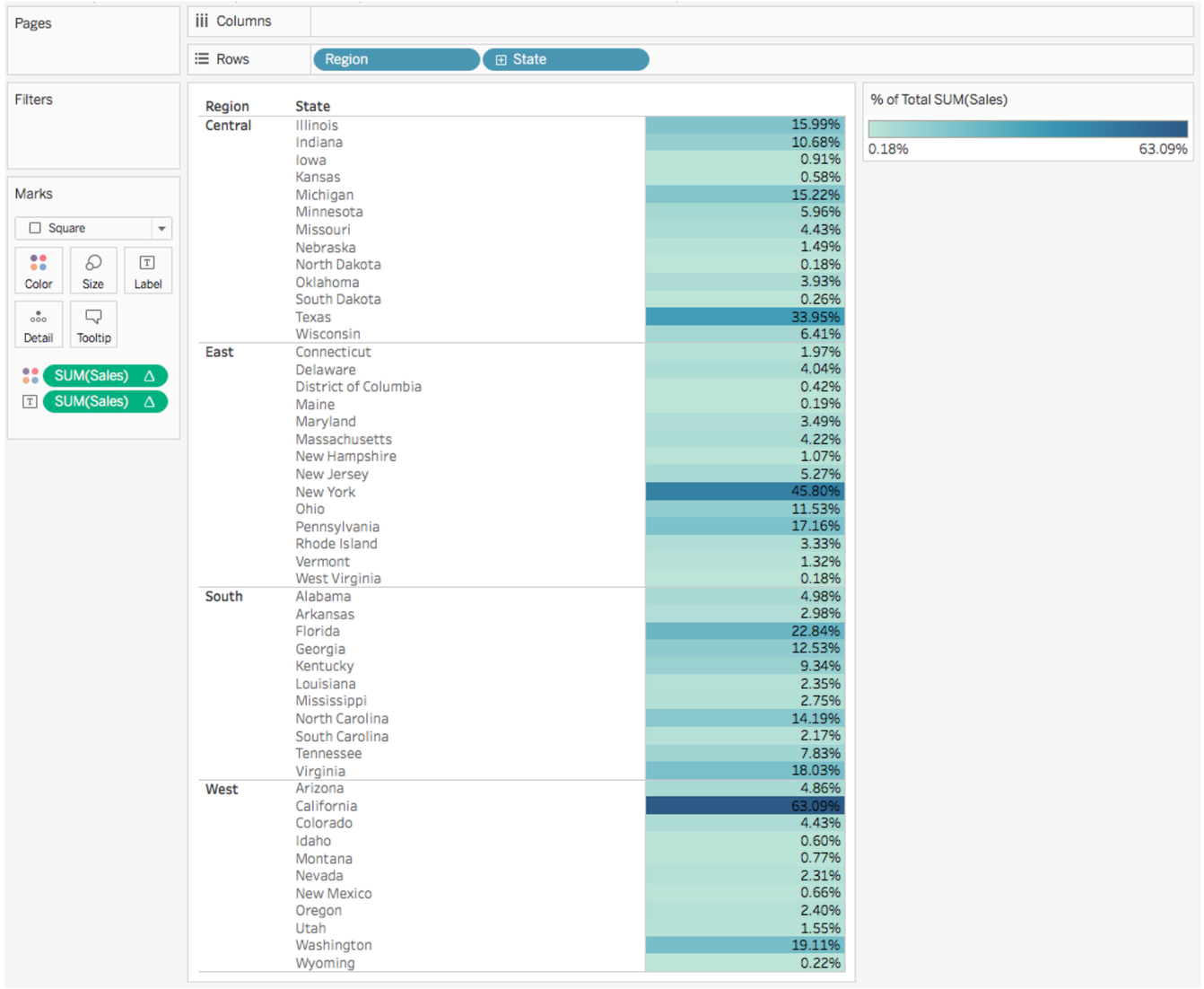
# Guided Exercise 2—Solution




| Region | State | |
|---|---|---|
| Central | Illinois | 15.99% |
| | Indiana | 10.68% |
| | Iowa | 0.91% |
| | Kansas | 0.58% |
| | Michigan | 15.22% |
| | Minnesota | 5.96% |
| | Missouri | 4.43% |
| | Nebraska | 1.49% |
| | North Dakota | 0.18% |
| | Oklahoma | 3.93% |
| | South Dakota | 0.26% |
| | Texas | 33.95% |
| | Wisconsin | 6.41% |
| East | Connecticut | 1.97% |
| | Delaware | 4.04% |
| | District of Columbia | 0.42% |
| | Maine | 0.19% |
| | Maryland | 3.49% |
| | Massachusetts | 4.22% |
| | New Hampshire | 1.07% |
| | New Jersey | 5.27% |
| | New York | 45.80% |
| | Ohio | 11.53% |
| | Pennsylvania | 17.16% |
| | Rhode Island | 3.33% |
| | Vermont | 1.32% |
| | West Virginia | 0.18% |
| South | Alabama | 4.98% |
| | Arkansas | 2.98% |
| | Florida | 22.84% |
| | Georgia | 12.53% |
| | Kentucky | 9.34% |
| | Louisiana | 2.35% |
| | Mississippi | 2.75% |
| | North Carolina | 14.19% |
| | South Carolina | 2.17% |
| | Tennessee | 7.83% |
| | Virginia | 18.03% |
| West | Arizona | 4.86% |
| | California | 63.09% |
| | Colorado | 4.43% |
| | Idaho | 0.60% |
| | Montana | 0.77% |
| | Nevada | 2.31% |
| | New Mexico | 0.66% |
| | Oregon | 2.40% |
| | Utah | 1.55% |
| | Washington | 19.11% |
| | Wyoming | 0.22% |

The State with the highest percentage of sales within its respective region is Texas, with 34% of sales in the Central region.

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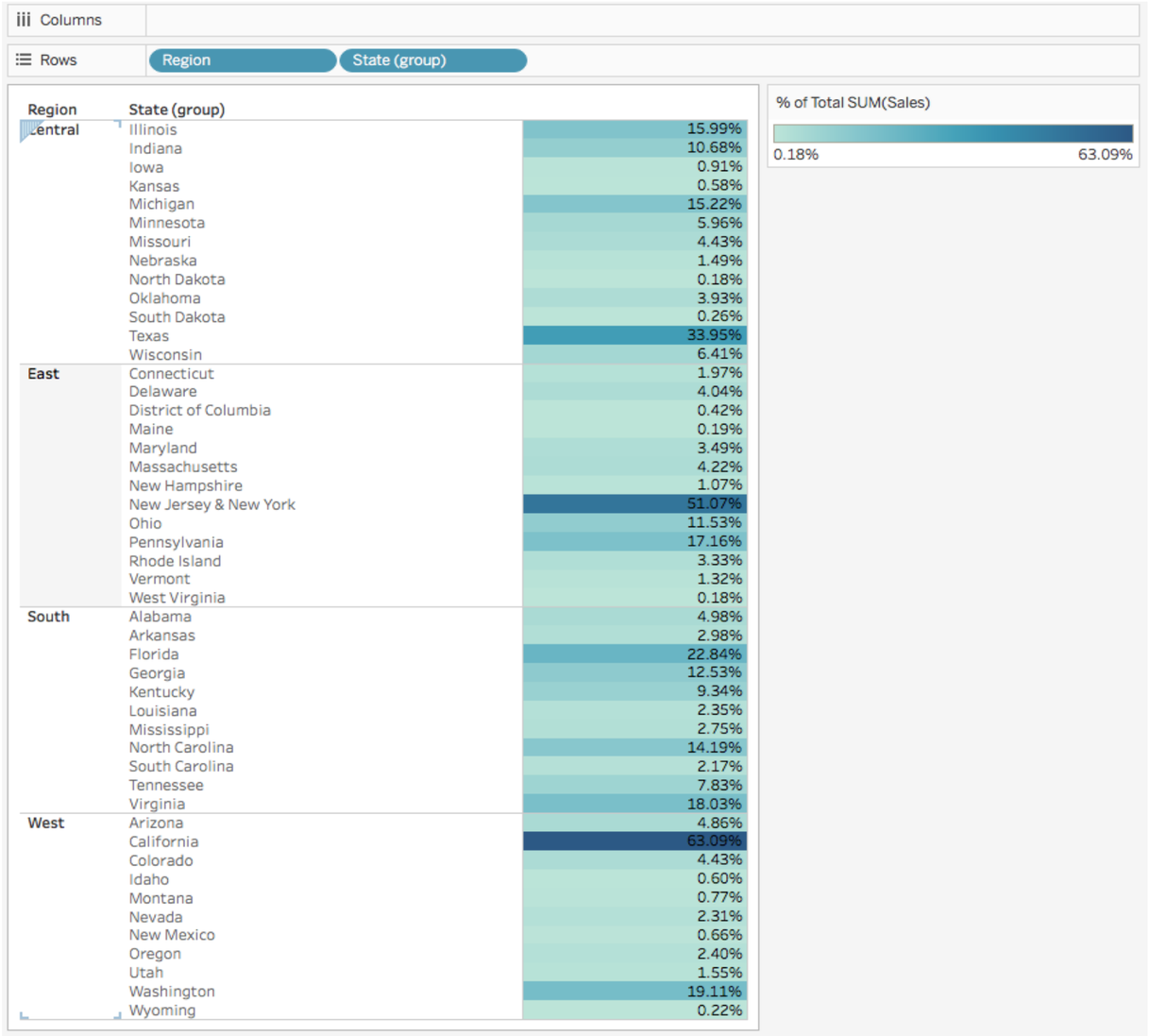
# Guided Exercise 2—Solution




| Region | State (group) | |
|---|---|---|
| Central | Illinois | 15.99% |
| | Indiana | 10.68% |
| | Iowa | 0.91% |
| | Kansas | 0.58% |
| | Michigan | 15.22% |
| | Minnesota | 5.96% |
| | Missouri | 4.43% |
| | Nebraska | 1.49% |
| | North Dakota | 0.18% |
| | Oklahoma | 3.93% |
| | South Dakota | 0.26% |
| | Texas | 33.95% |
| | Wisconsin | 6.41% |
| East | Connecticut | 1.97% |
| | Delaware | 4.04% |
| | District of Columbia | 0.42% |
| | Maine | 0.19% |
| | Maryland | 3.49% |
| | Massachusetts | 4.22% |
| | New Hampshire | 1.07% |
| | New Jersey & New York | 51.07% |
| | Ohio | 11.53% |
| | Pennsylvania | 17.16% |
| | Rhode Island | 3.33% |
| | Vermont | 1.32% |
| | West Virginia | 0.18% |
| South | Alabama | 4.98% |
| | Arkansas | 2.98% |
| | Florida | 22.84% |
| | Georgia | 12.53% |
| | Kentucky | 9.34% |
| | Louisiana | 2.35% |
| | Mississippi | 2.75% |
| | North Carolina | 14.19% |
| | South Carolina | 2.17% |
| | Tennessee | 7.83% |
| | Virginia | 18.03% |
| West | Arizona | 4.86% |
| | California | 63.09% |
| | Colorado | 4.43% |
| | Idaho | 0.60% |
| | Montana | 0.77% |
| | Nevada | 2.31% |
| | New Mexico | 0.66% |
| | Oregon | 2.40% |
| | Utah | 1.55% |
| | Washington | 19.11% |
| | Wyoming | 0.22% |

When combined, New York and New Jersey account for 51% of the sales in the East region.

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# Key Takeaways

- Calculated fields are formulas that the user creates using standard functions and operators and existing fields from your dataset.
- Quick Table Calculations are an efficient way to perform calculations on your data within the worksheet.
- Aggregation functions are mathematical functions used to produce aggregated data.
- Grand totals and subtotals can be added to your worksheet quickly and easily.

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This concludes “Performing Calculations in Tableau.”

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