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Q1) **Geospatial data help to represent geographical data in many shapes and format. Use the Sample Superstore data set to perform following task.**

a. Assign the geographical role to state and mention the need and steps. Furthermore, perform the geographical hierarchy to explore the different levels.

Ans: Because we're looking at geographic data (the Region field), you have the option to build a map view. Map views are great for displaying and analysing this kind of information.

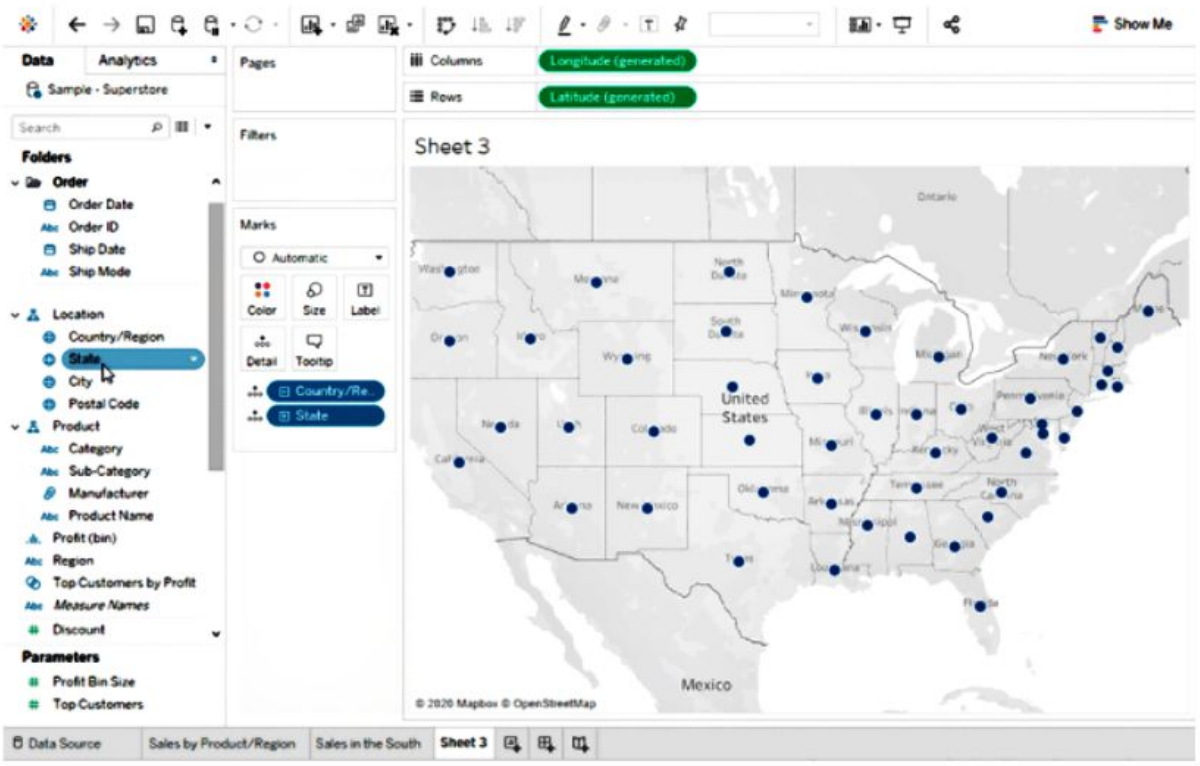
Start fresh with a new worksheet.

1. Click the New worksheet icon at the bottom of the workspace.

   Tableau keeps your previous worksheet and creates a new one so that you can continue exploring your data without losing your work.

2. In the Data pane, double-click State to add it to Detail on the Marks card.

   Now you've got a map view!

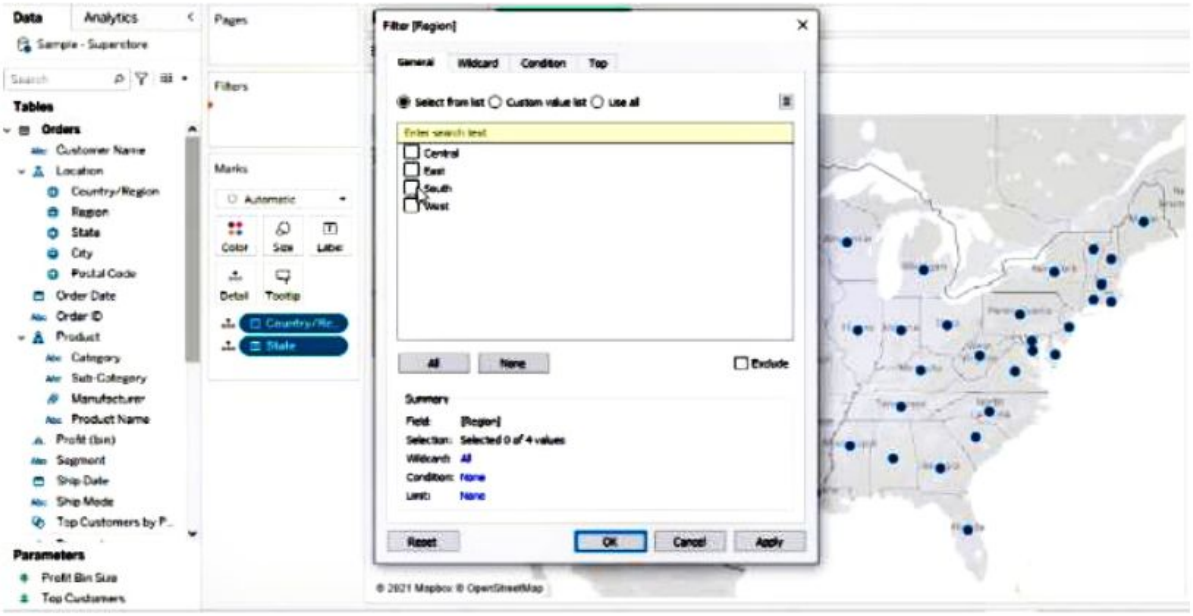


Now, having a cool map focused on 48 states is one thing, but you wanted to see what was happening in the South, remember?

3. Drag Region to the Filters shelf, and then filter down to the South only. The map view zooms in to the South region, and there is a mark for each state (11 total).

   Now you want to see more detailed data for this region, so you start to drag other fields to the Marks card:

4. Drag the Sales measure to Colour on the Marks card.



   The view automatically updates to a filled map, and colors each state based on its total sales. Because you're exploring product sales, you want your sales to appear in USD. Click the Sum(Sales) field on the Columns shelf, and select Format. For Numbers, select Currency.

   Any time you add a continuous measure that contains positive numbers (like Sales) to Color on the Marks card, your filled map is colored blue. Negative values are assigned orange.

   Sometimes you might not want your map to be blue. Maybe you prefer green, or your data isn't something that should be represented with the color blue, like wildfires or traffic jams. That would just be confusing!

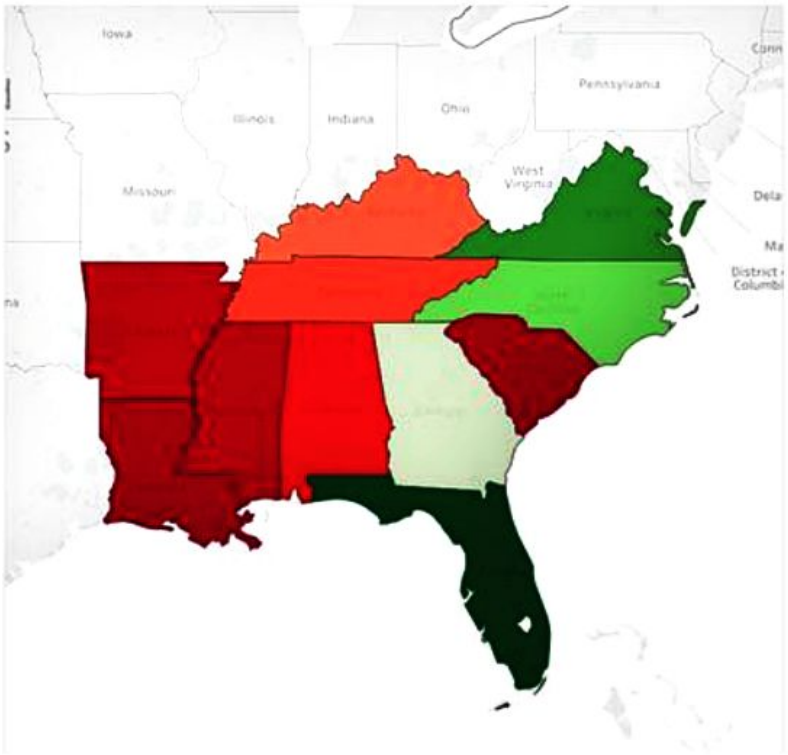
   No need to worry, you can change the color palette just like you did before.

5. Click Colour on the Marks card and select Edit Colours.

   For this example, you want to see which states are doing well, and which states are doing poorly in sales.

6. In the Palette drop-down list, select Red-Green Diverging and click OK. This allows you to see quickly the low performers and the high performers.

   our view updates to look like this:

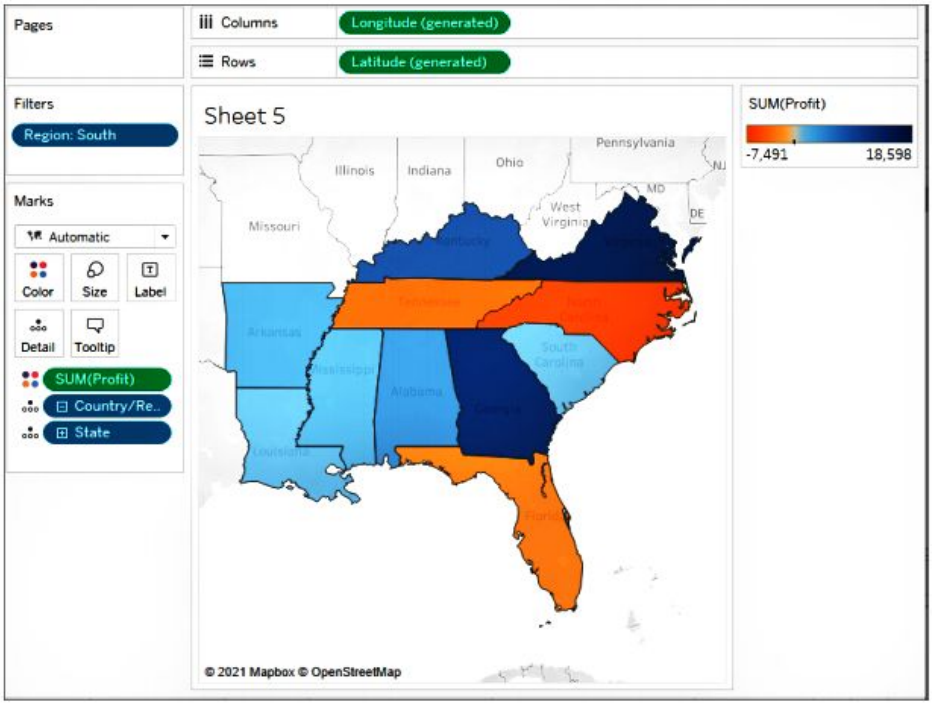


7. Click the Undo icon in the toolbar to return to that nice, blue view.

   There's still a colour problem. Everything looks dandy—that's the problem!

   At first glance, it appears that Florida is performing the best. Hovering over its mark reveals a total of 89,474 USD in sales, as compared to South Carolina, for example, which has only 8,482 USD in sales. However, have any of the states in the South been profitable?

8. Drag Profit to Colour on the Marks card to see



To create a geographic hierarchy:

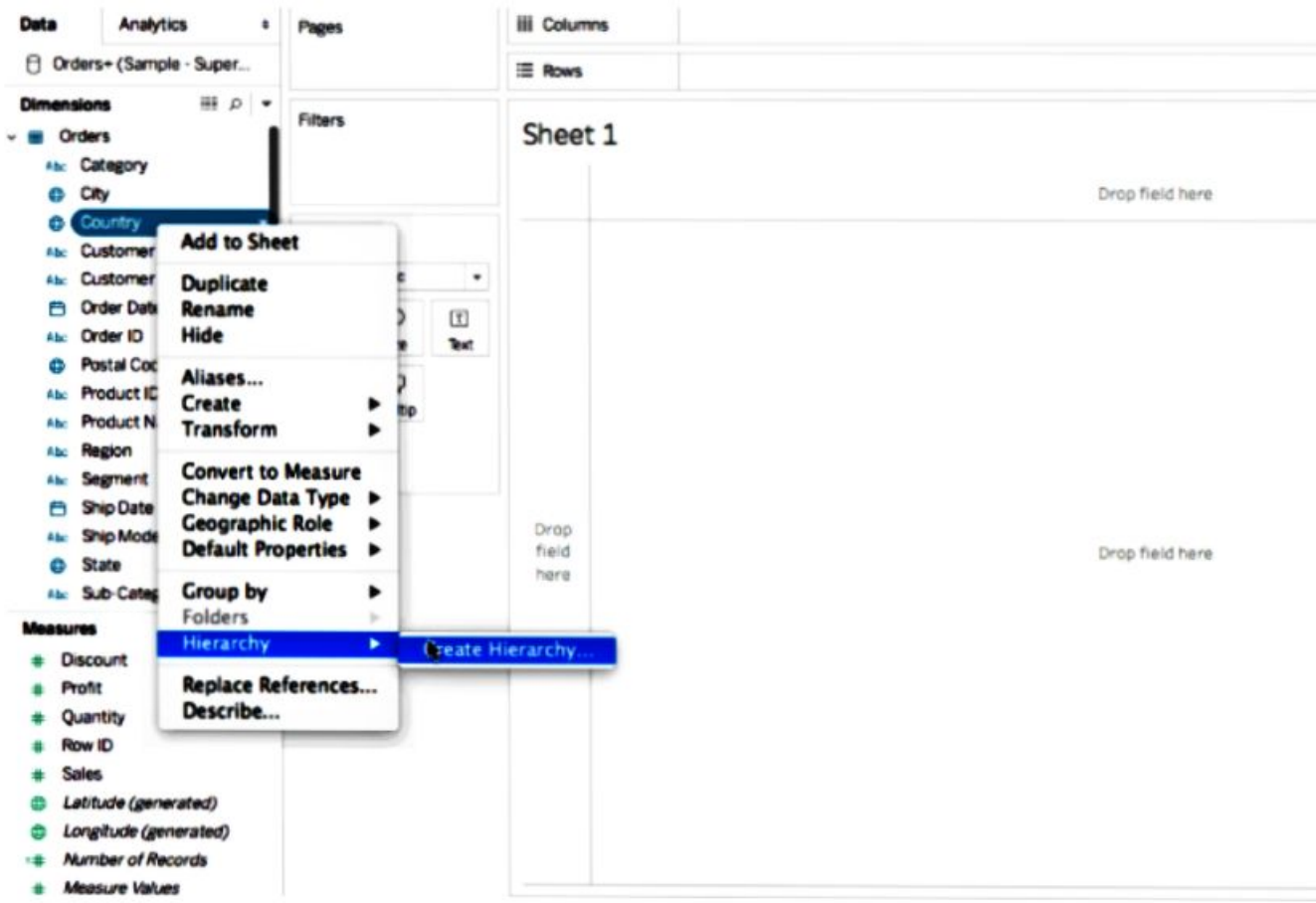
1. In the Data pane, right-click the geographic field, Country, and then select Hierarchy > Create Hierarchy.

2. In the Create Hierarchy dialog box that opens, give the hierarchy a name, such as Mapping Items, and then click OK.

   At the bottom of the Dimensions section, the Mapping Items hierarchy is created with the Country field.

3. In the Data pane, drag the State field to the hierarchy and place it below the Country field.

4. Repeat step 3 for the City and Postal Code fields.

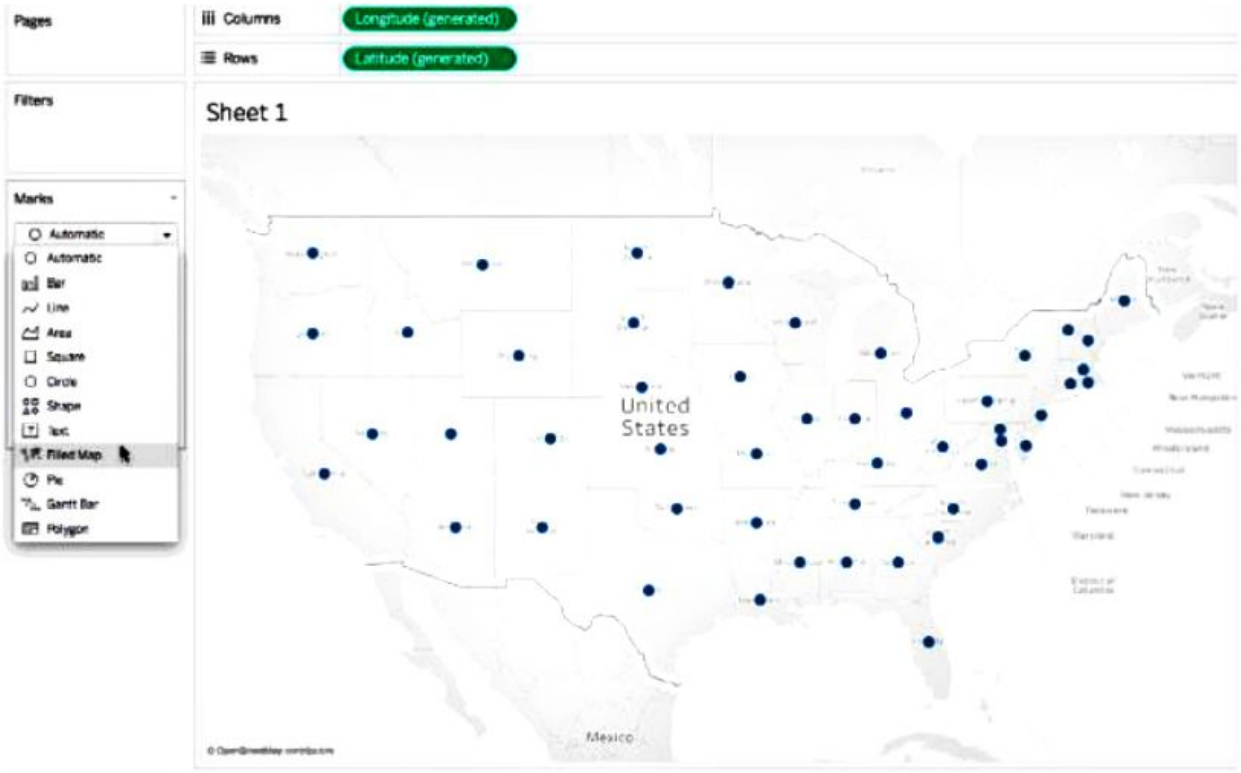


b. **Design a Map and change the shape of points to polygons. In addition, the label of these points must be Profit in that region (state or country).**

Ans: Change from points to polygons

The default map type in Tableau is often a point map. When you have geographic roles assigned to your geographic data, however, it's easy to change those data points to polygons.

1. On the Marks card, click the Mark Type drop-down and select Filled Map.



The map updates to a polygon map.

c. Add the custom background and custom territories.

Ans: Customize your background map

The background map is everything behind your marks (borders, oceans, location names, etc.) You can customize the style of this background map, as well as add map layers and data layers. In addition to customizing the background maps, you can also connect to your own WMS server or Mapbox map.

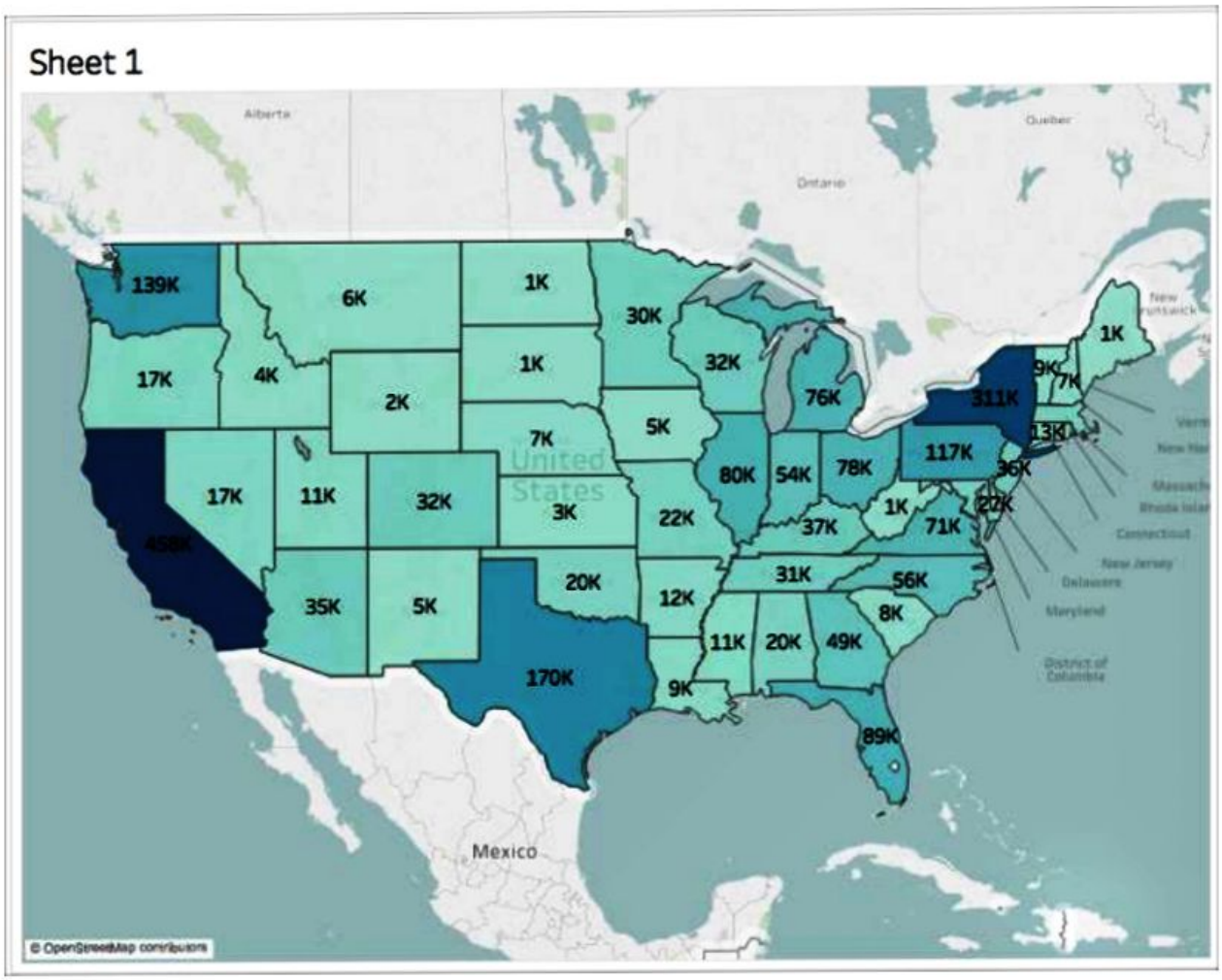
To customize your background map:

1. Select Map > Map Layers.

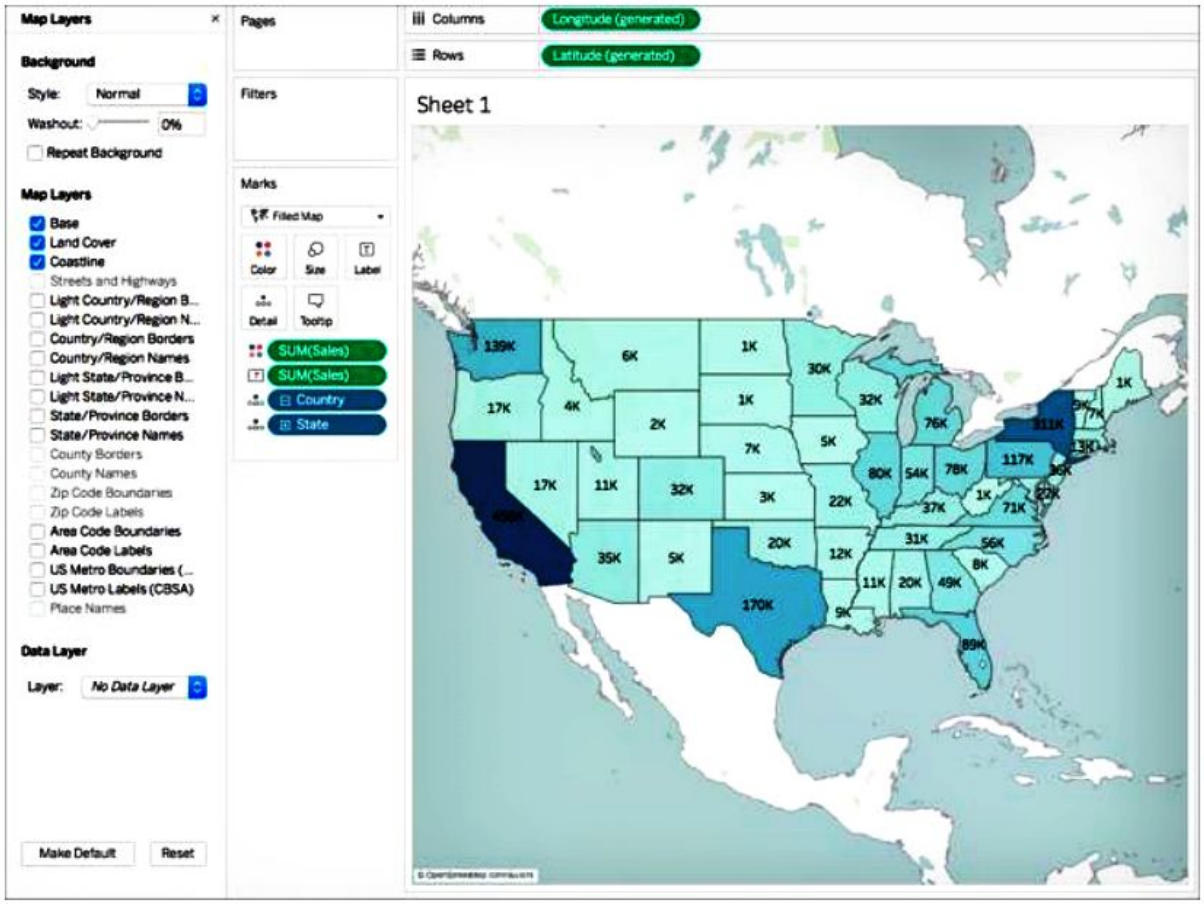
   The Map Layers pane appears on the left side of the workspace. This is where all background map customization happens.

2. In the Map Layers pane, click the Style drop-down and select Normal.

   The background map updates to look like this:



3. In the Map Layers pane, under Map Layers, select Coastlines, and then clear Country/Region Borders, Country/Region Names, State/Province Borders, and State/Province Names.



4. At the top of the Map Layers pane, click the X to return to the Data pane.

   The background map is now simplified to draw attention to your data.

Create custom territories

As you build your map view, you might want to group existing locations together to create your own territories or regions, such as sales territories for your organization.

1. In the Data pane, right-click State and select Create > Group.

2. In the Create Group dialog box that opens, select California, Oregon, and Washington , and then click Group. Each group you create represents a territory.

   Note: To multi-select, hold down Ctrl (Command on Mac) as your select states.

3. Right-click the new group you just created and select Rename.

4. Rename the group, West Coast.

5. For the next territory,
   select Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas, and then click Group.

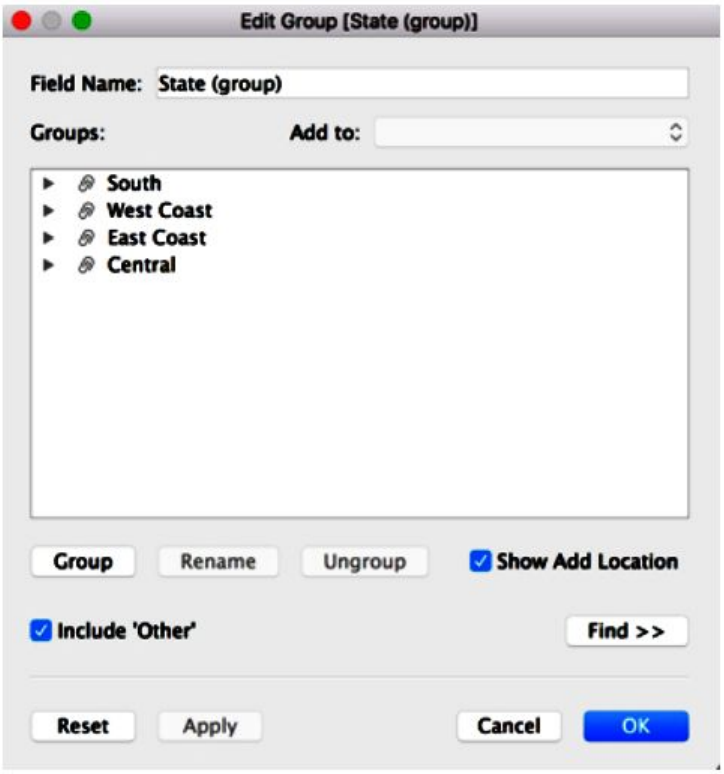
6. Rename this group, South.

7. For the third territory, select Connecticut, Delaware, District of Columbia, Main, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and finally, West Virginia, and then click Group.

8. Rename this group, East Coast.

9. Select Include Other to group the remaining states.

10. Rename the Other group, Central.

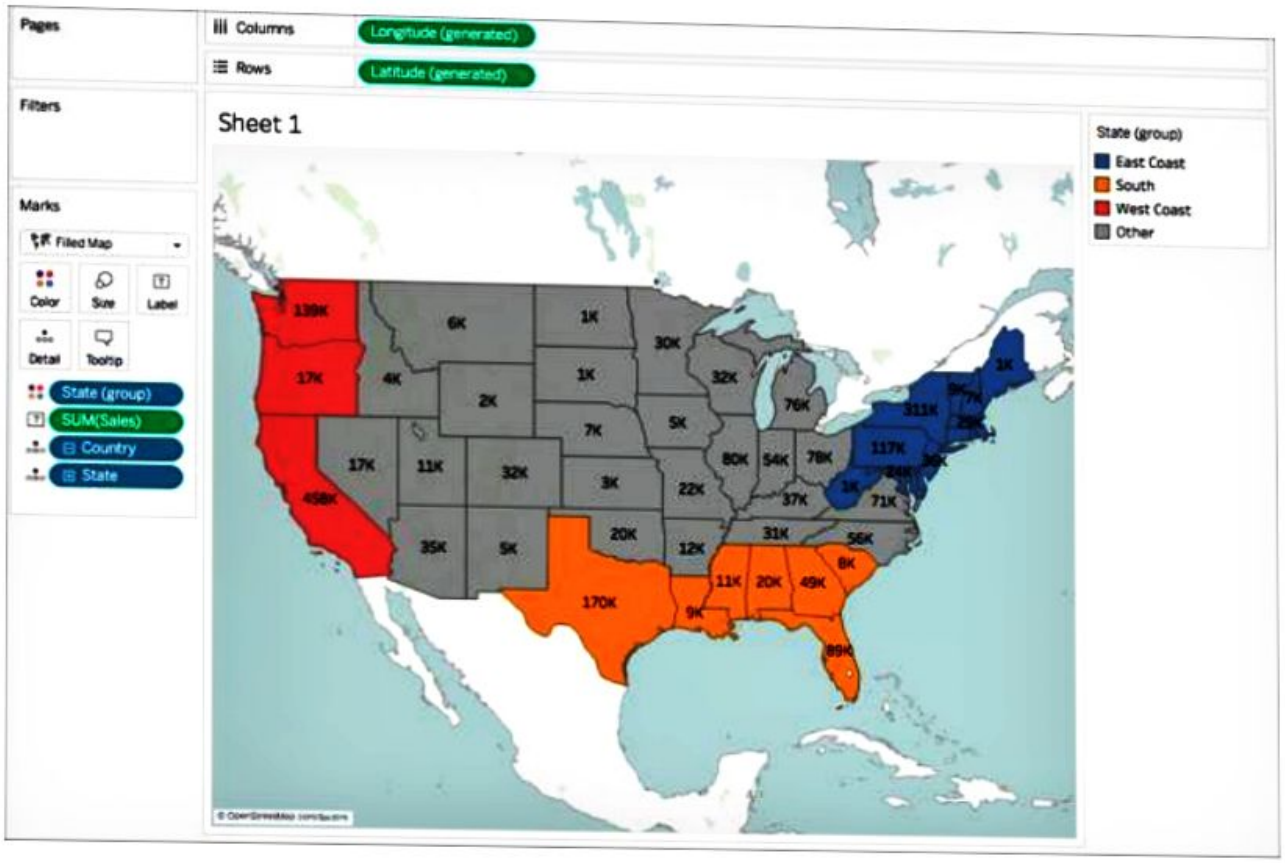


11. Click OK.

    A State (group) field appears in the Data pane beneath your other mapping items.

12. From the Data pane, drag State (group) to Color on the Marks card.

    The view updates to look like this:

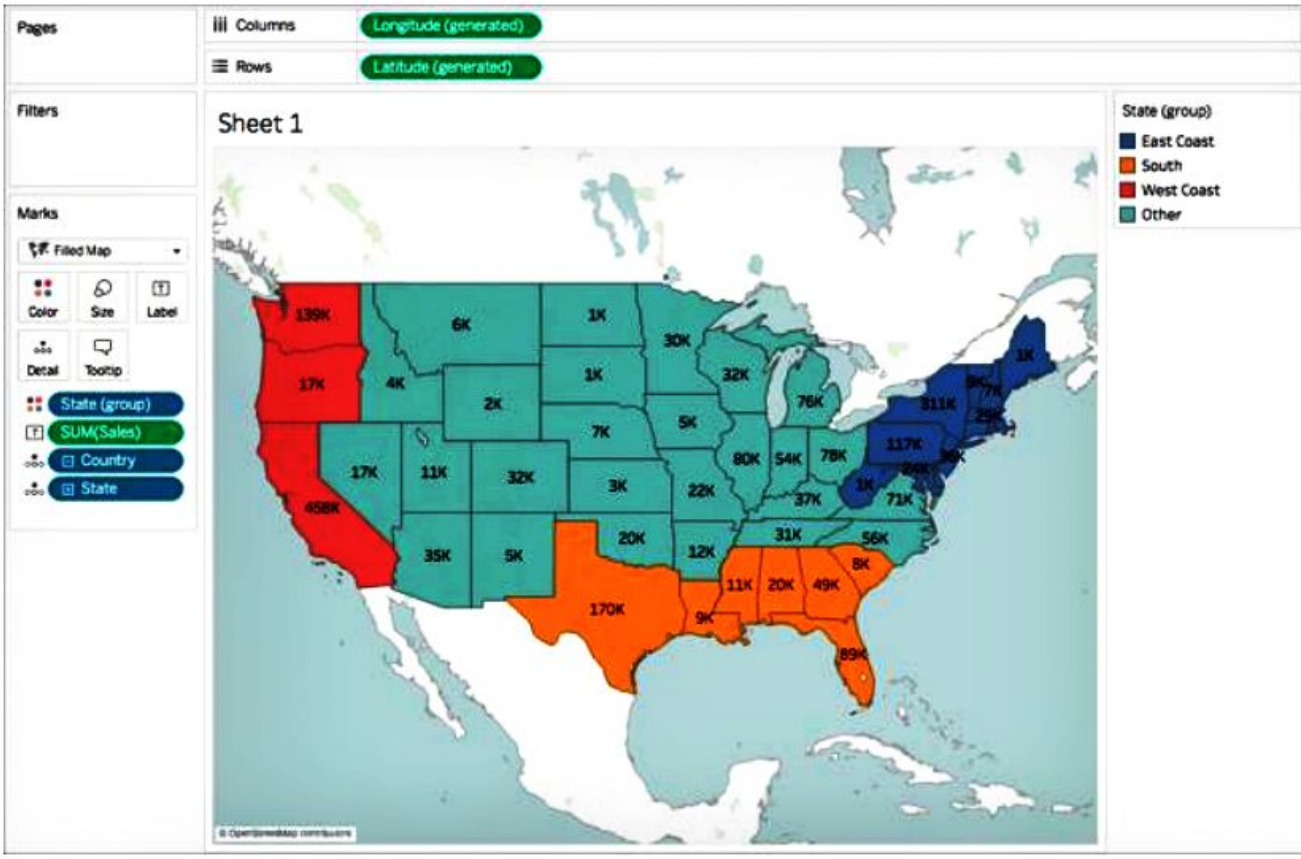


Notice that each group has a different color.

13. On the Marks card, click the Color icon and select Edit Colors.

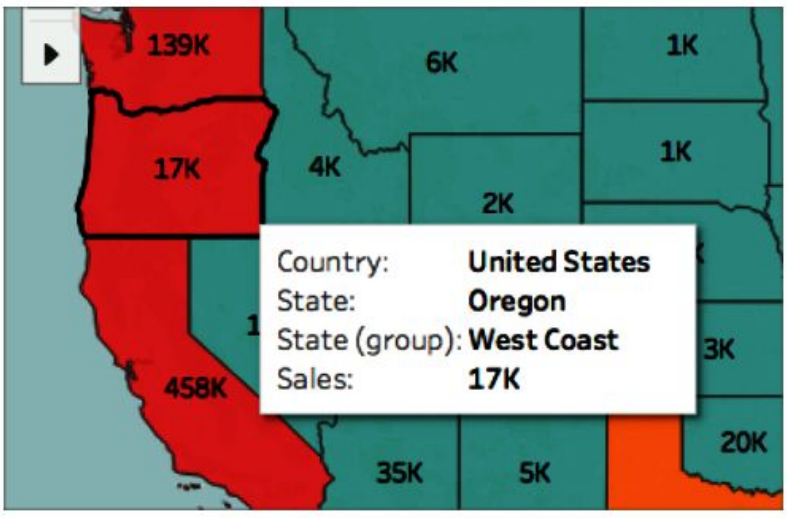
14. In the Edit Colors dialog box that appears, select Assign Palette, and then click OK.

    The marks update with new colors.



15. From Measures, drag Sales to Tooltip on the Marks card.

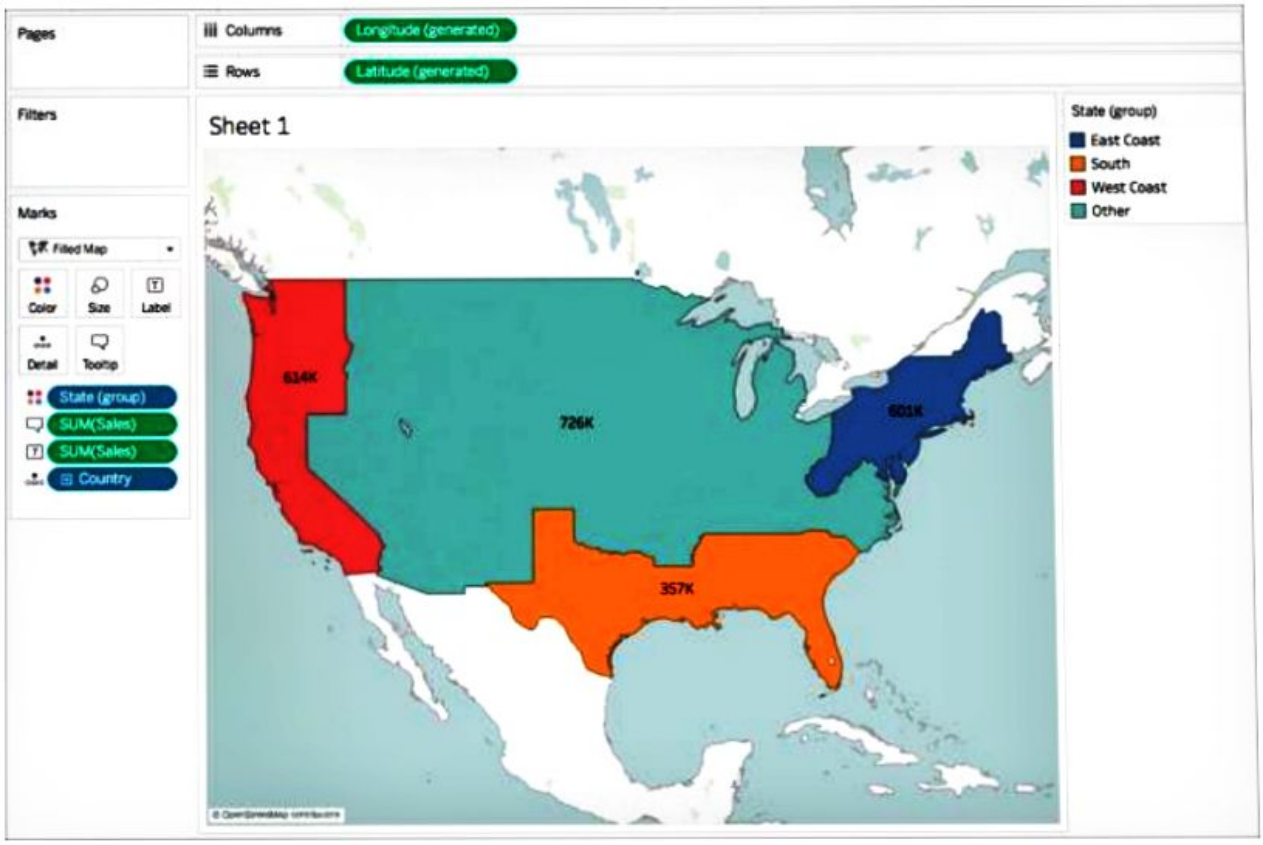
    When you hover over a state, a tooltip appears with the sales for that state, among other information. You'll learn how to edit this tooltip later.



16. On the Marks card, click the minus (-) icon on the Country field to remove State from the level of detail.

    If you did not create a hierarchy, you can drag State from the view to remove it. You can remove any field by dragging it from the view.

The states no longer appear on the map. Notice how the sum of sales has updated for the labels and in the tooltip? This is because custom territories aggregate at the level of the group, rather than separately for each location within the group. So the sum of sales your are seeing in the West Coast group, for example, are the total sales for California, Oregon, and Washington combined.



Q2. Number functions allow performing various types of calculations. Do the following functions by creating the calculated fields.

a. Show the difference in Ceiling and Floor functions using superstore dataset. Mention the databases where these function are supported.

Ans: **CEILING**

This function returns the given number rounded off to the nearest integer of equal or greater value.

Syntax

CEILING(number)

CEILING(3.1415) = 4

FLOOR

This function returns the given number rounded off to the nearest integer of equal or lesser value.

Syntax

FLOOR(number)

FLOOR(6.1415) = 6

We can use these both functions in:

Microsoft SQL Server

MySQL

Oracle

MongoDB

SAP

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b. Which function helps maps the longitude and latitude value to nearby hexagonal bin? Demonstrate with the help of example.

Ans: when you drop the newly rounded latitude and longitude values onto the map, Tableau will aggregate all of the points with the same coordinates and place a single mark at the center of the 'bin' (center image).

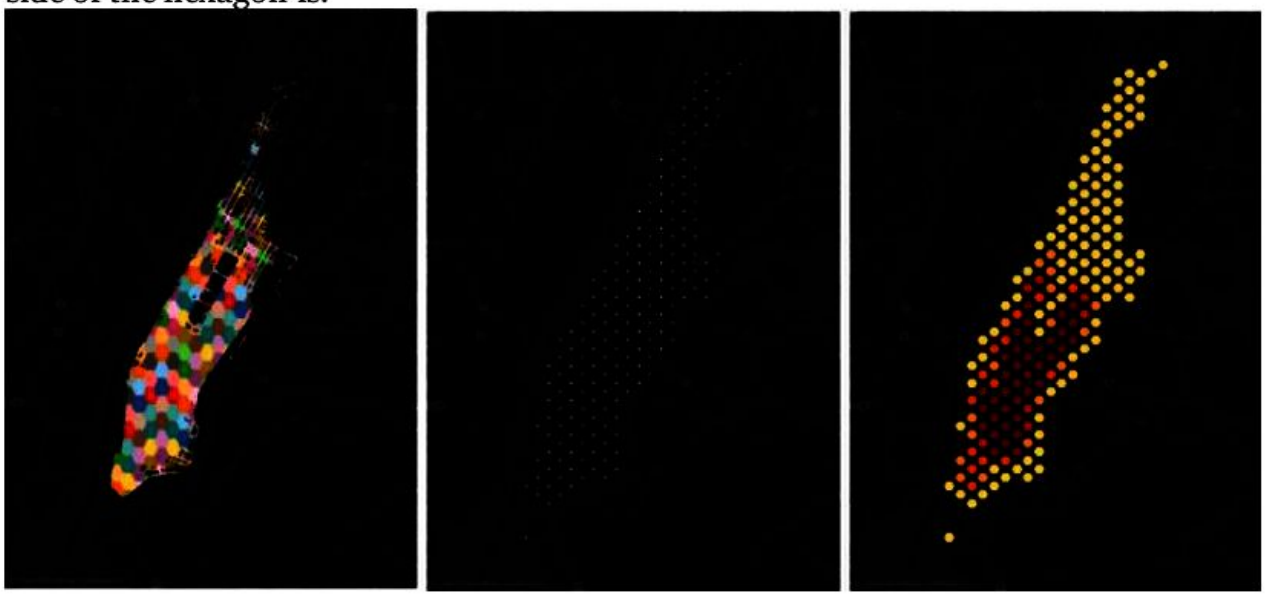
Set that to a square shape and re-size until the bins align nicely (right image). The left image shows all of the original points color encoded by which bin they fall into, so you can more easily see how they were aggregated together

Hexagonal bins

It's just as easy to make hexagonal bins. Tableau has two built-in functions called HexbinX() and HexbinY(). Instead of calculating the center point of square bins, these calculate out the center location of hexagonally-shaped bins. The math is trickier than just rounding, so fortunately Tableau has done the heavy lifting for us.

HexbinX and HexbinY both use the same inputs – the X and Y coordinates for each point. That is just your longitude value (X) and latitude value (Y). Just like how the square bins were defined based on how many decimal degrees each side of the square was, the hexagonal bins will be defined based on how many decimal degrees each

side of the hexagon is.



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c. Which functions are used to count the values with and without null values? Demonstrate using an example to count the values in superstore dataset.

Ans: To count Nulls in Tableau, use the ISNULL function to convert each Null to True, and each "not Null" to False.

ISNULL is a boolean function, so returns either True or False. Converting a boolean to a number using the INT function converts True to 1 and False to 0. Once the True and False are numbers, they are simple to sum. Therefore, the formula to count Nulls in Tableau is:
SUM(INT(ISNULL([Field])))