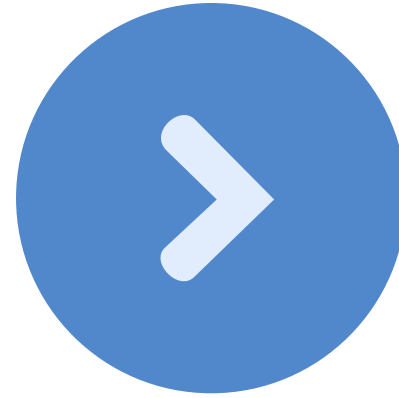# MARKET DATA ANALYSIS & VISUALIZATION

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06/02/2025

Project Overview

Dataset Description:
- **Market Type: Retail**
- **Source: Neuro Tech Dataset**
- **Size: thousands of transactions with customer ,product and location details.**

Purpose of the Analysis:
- Understand Sales Trends: Identify best-selling products and seasonal trends.
- Customer Insights: Analyze purchasing patterns by region and demographics.
- Decision Support: Provide data-driven insights for business strategy using Power BI dashboards.
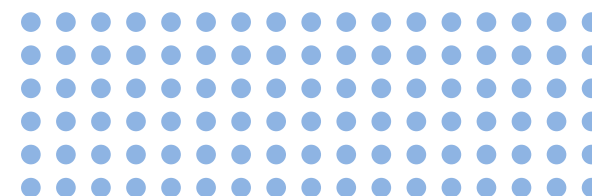
Data Cleaning & Exploration
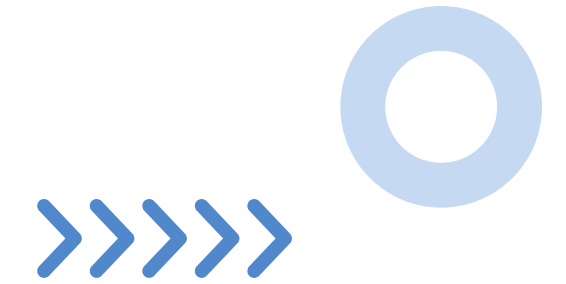
Tools used: Python (Pandas, NumPy, Matplotlib, SeaBorn.)

Steps taken:
- identifying missing values: customer IDs ,Invoice No's
- fixing inconsistencies :
    - 0's and wrong entered units price
    - unification of "order state" in dim_state_region_mapping & dim_customer
    - adding state column in dim_customer table
- removing duplicates: duplicates in state_region_mapping

Key insights from exploration:
- monthly sales increases
- top 5 products:
    1- Taste of the Wild High Prairie Grain-Free Dry   2- Dog and Puppy Pads
    3- Memory Foam Pet Beds   4- Rated Dog Poop Bags
    5- Litter Slide Multi-Cat Scented Clumping Clay
- there is high correlation between Sales and Quantity
- some anomalies found in unit price but handled

Data Analysis Insights

- By decreasing unit price in "may" the sales started to increase

- decreasing unit price has a negative impact on GP% "decreased by 3-4 percentage"

- but the increase of sales rate increased sales and gross profit and this covers and increased GP% in the next months

- the second sale on prices the market made was in September and November

- this sale lead the market two reach the 1st highest total sales and gross profit on october .

- the second peak "highest one" for all measures (sales ,gross profit ,GP%) in November

Sales & Unit Price Per Month

● Sales ── Unit Price Per Month

Sales, Gross Profit & GP% by Month
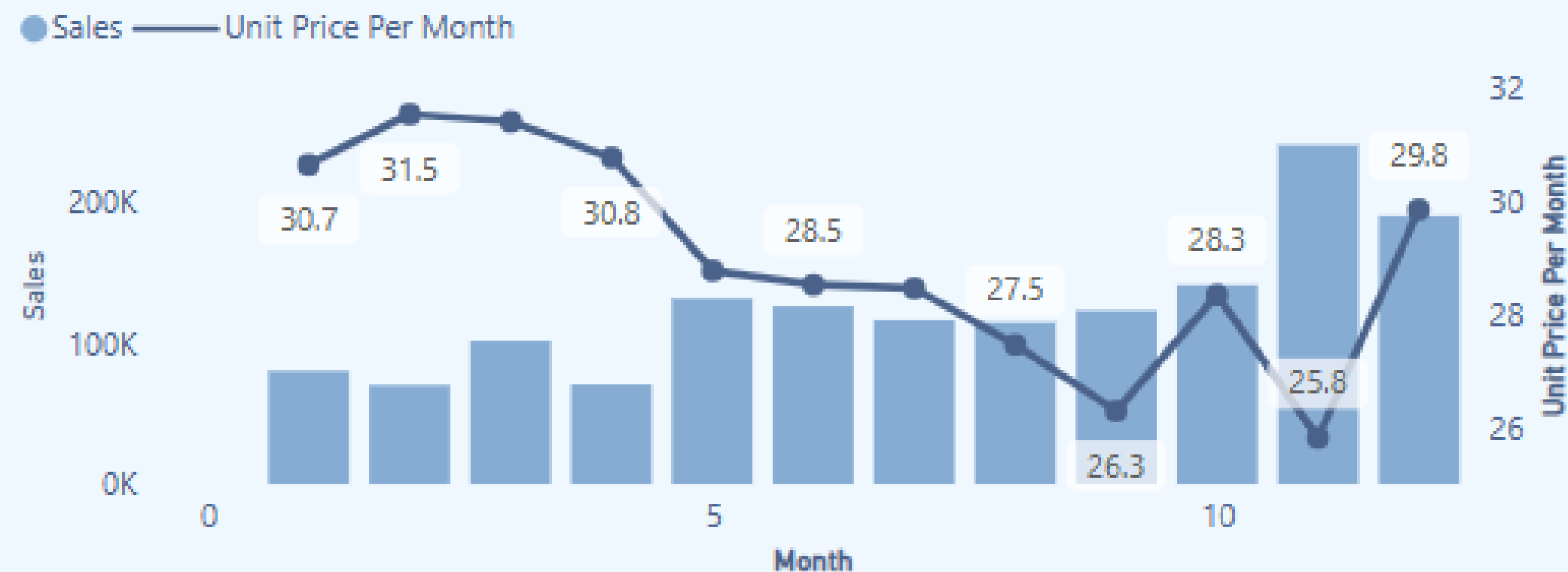
● Sales ● Gross Profit ● GP%
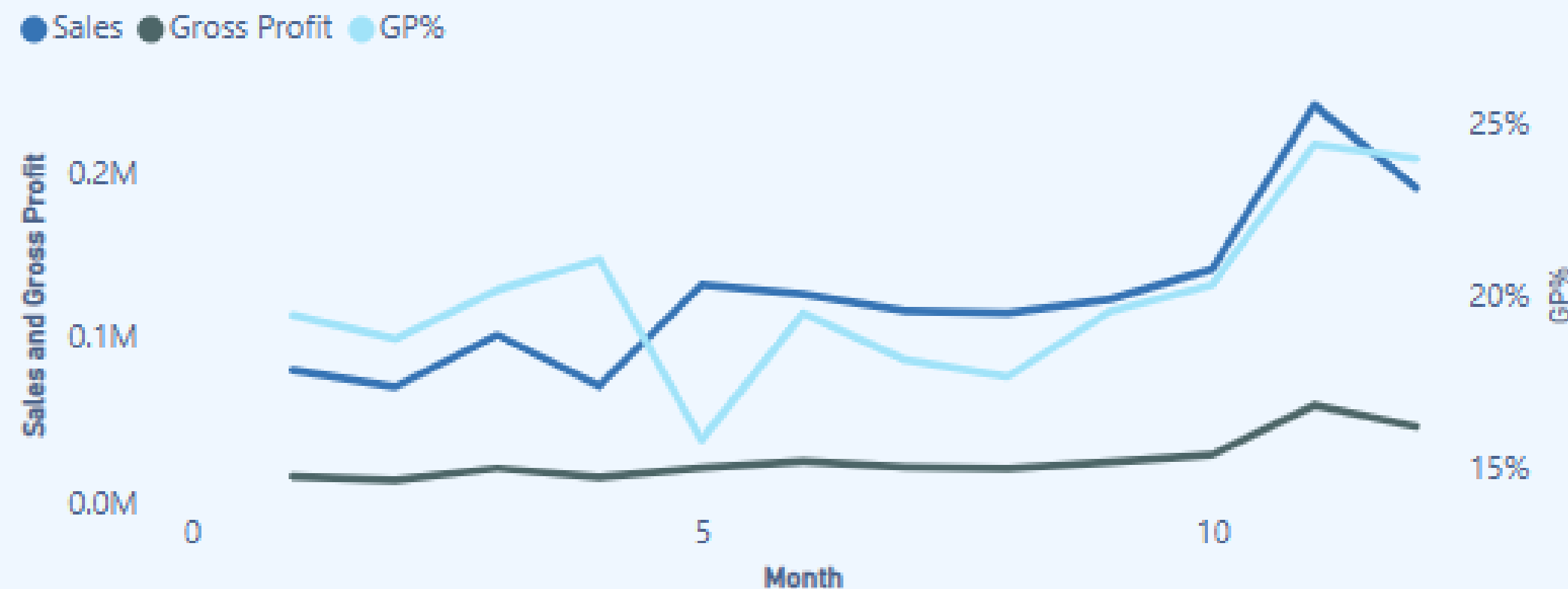
Power BI Dashboard

Sales Performance

Total Sales	Avg Transaction Sales	Return %	GP%
1.50M	**133.45**	**1.96%**	**20.43%**

Sales & Unit Price Per Month

● Sales —— Unit Price Per Month

Data labels (Unit Price Per Month): 30.7, 31.5, 30.8, 28.5, 27.5, 26.3, 28.3, 25.8, 29.8

Sales Velocity by Month

Values: 160, 137, 173, 144, 268, 196, 262, 243, 501, 310
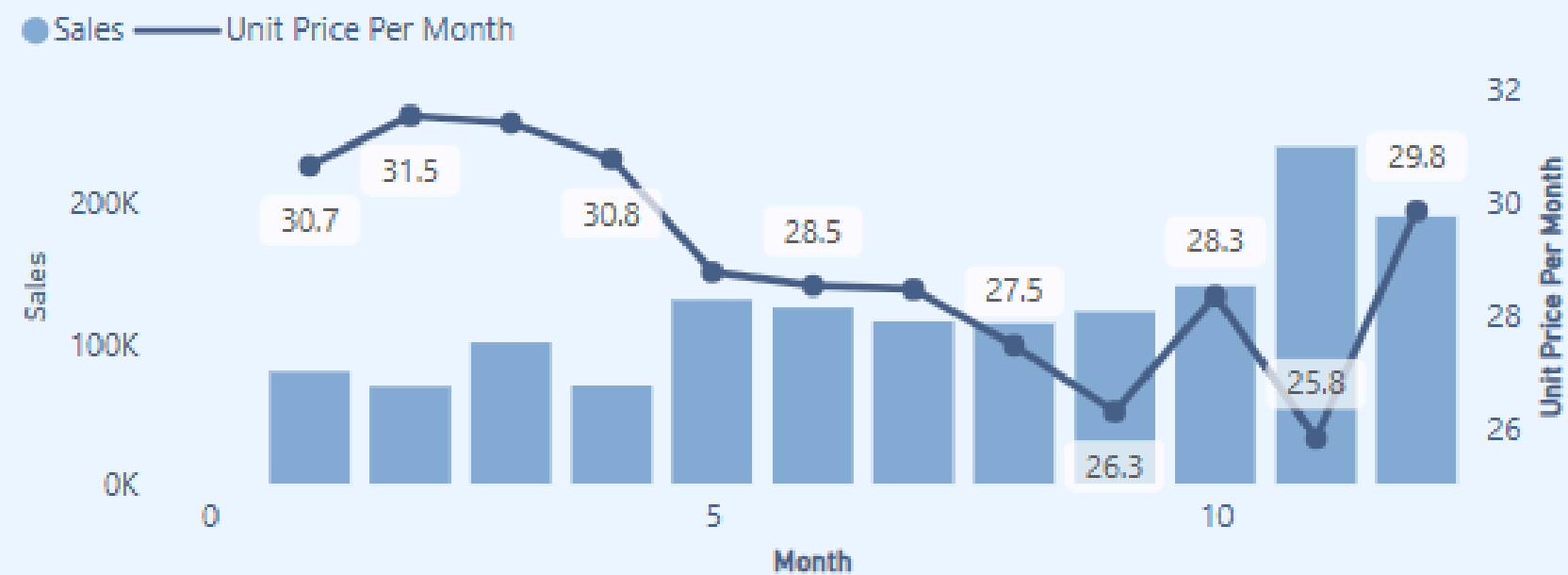
Sales, Gross Profit & GP% by Month
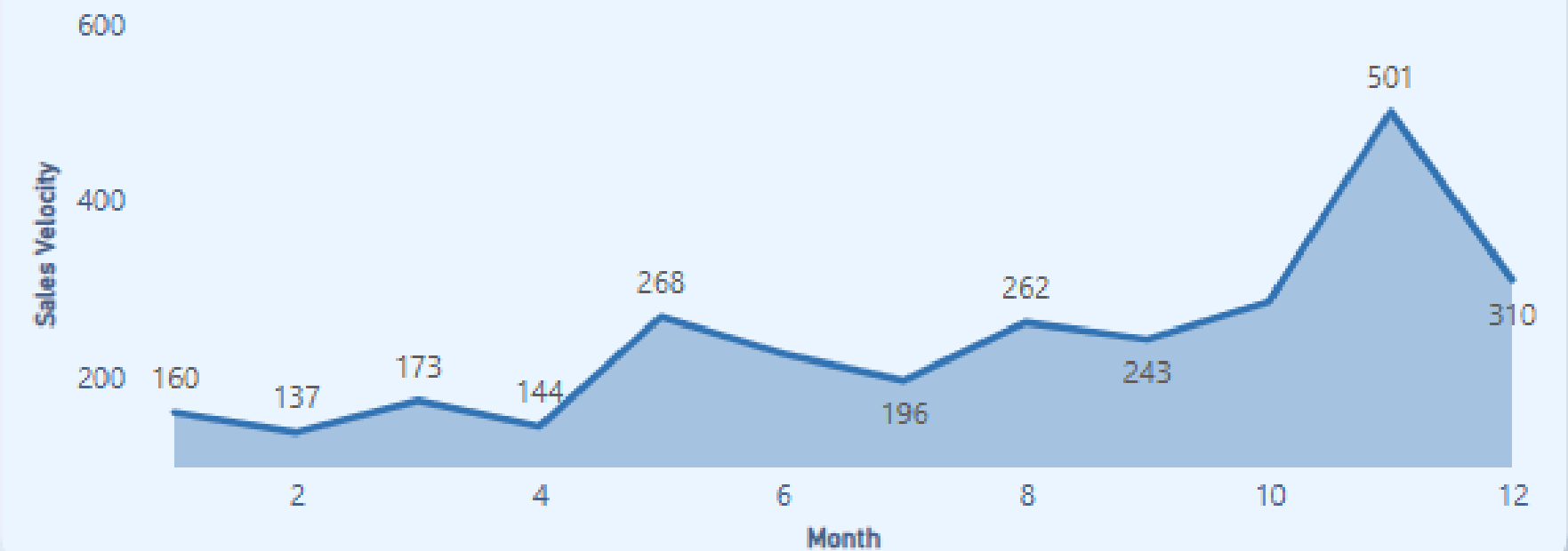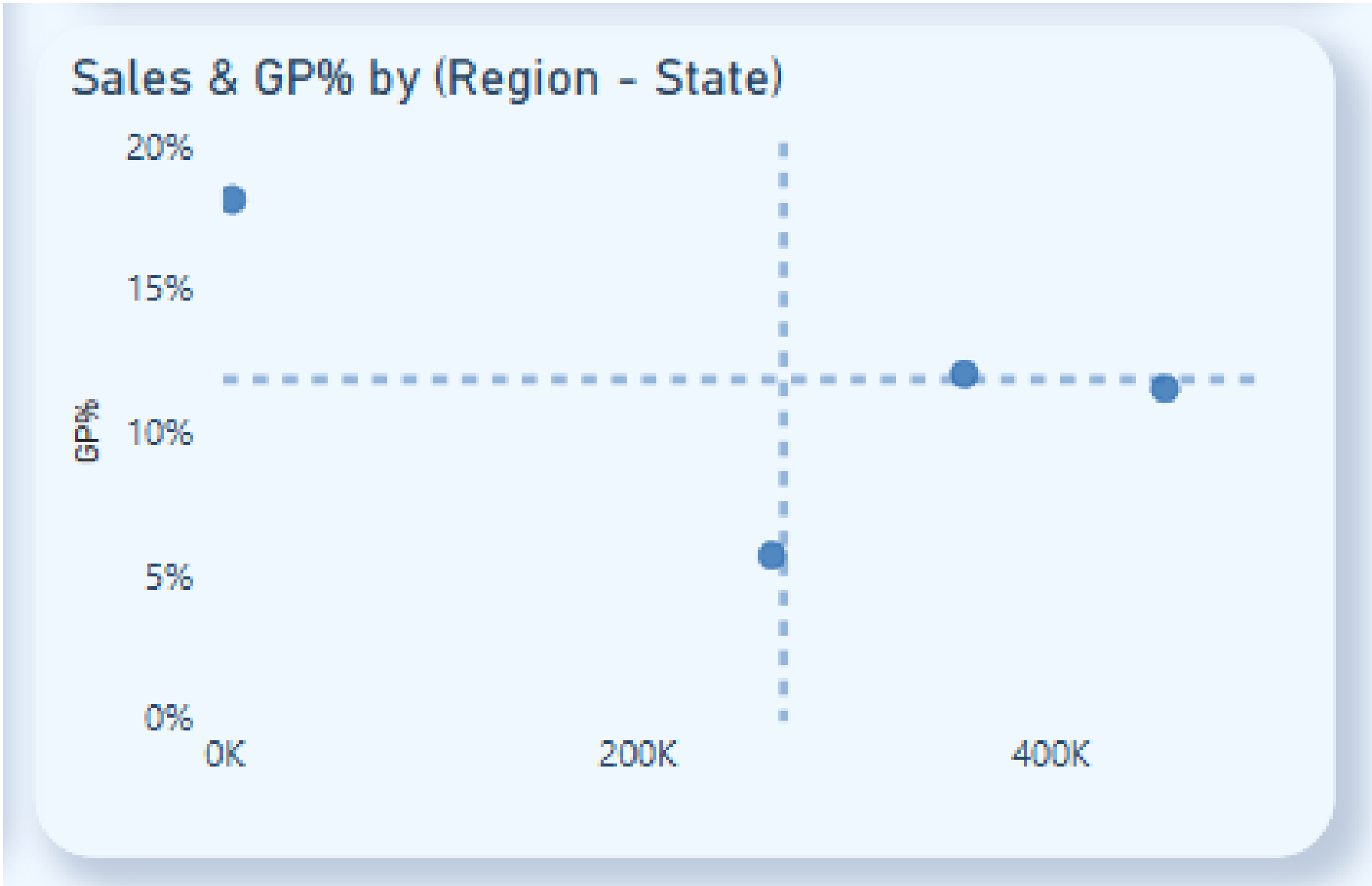
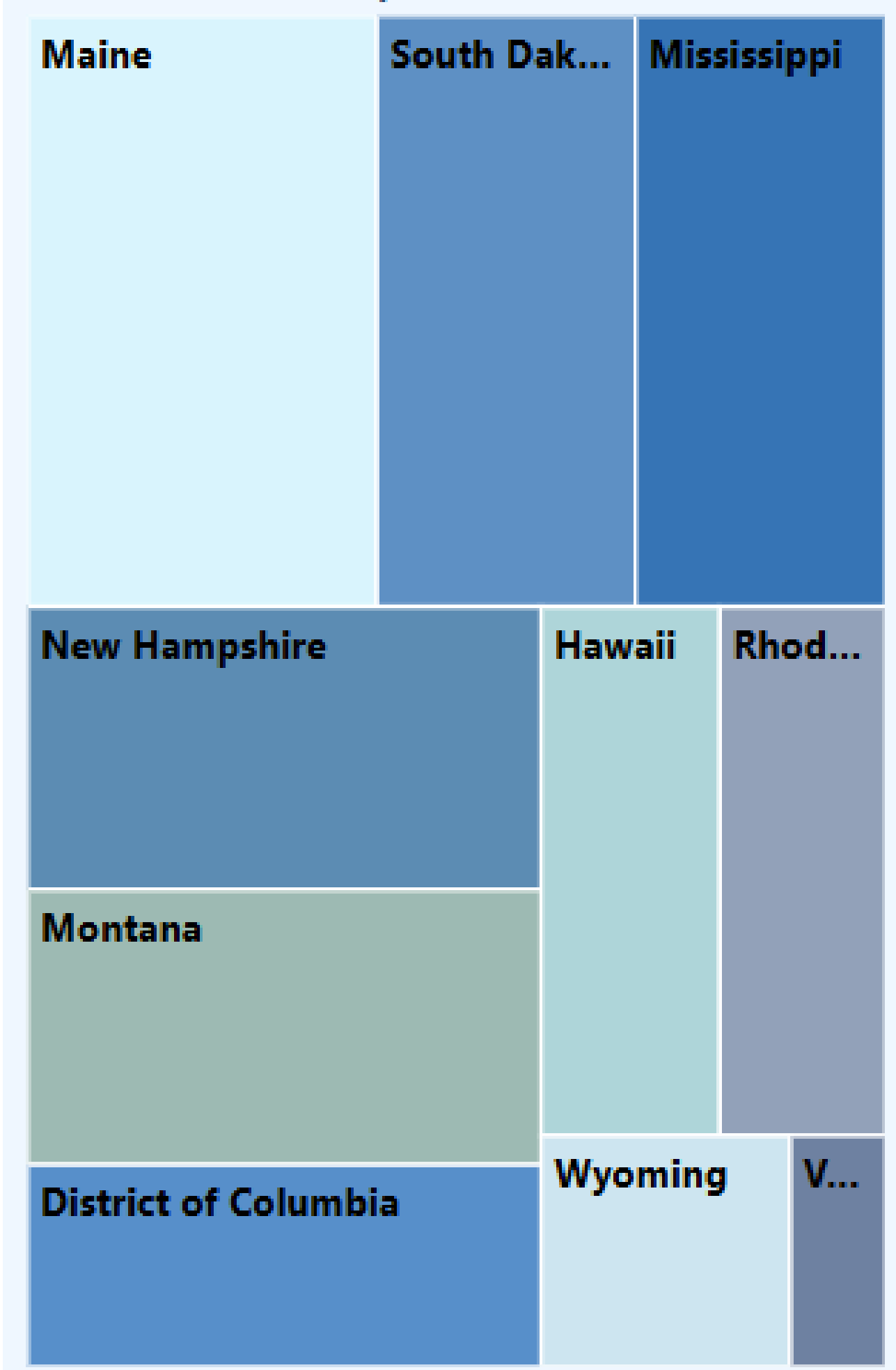● Sales ● Gross Profit ● GP%
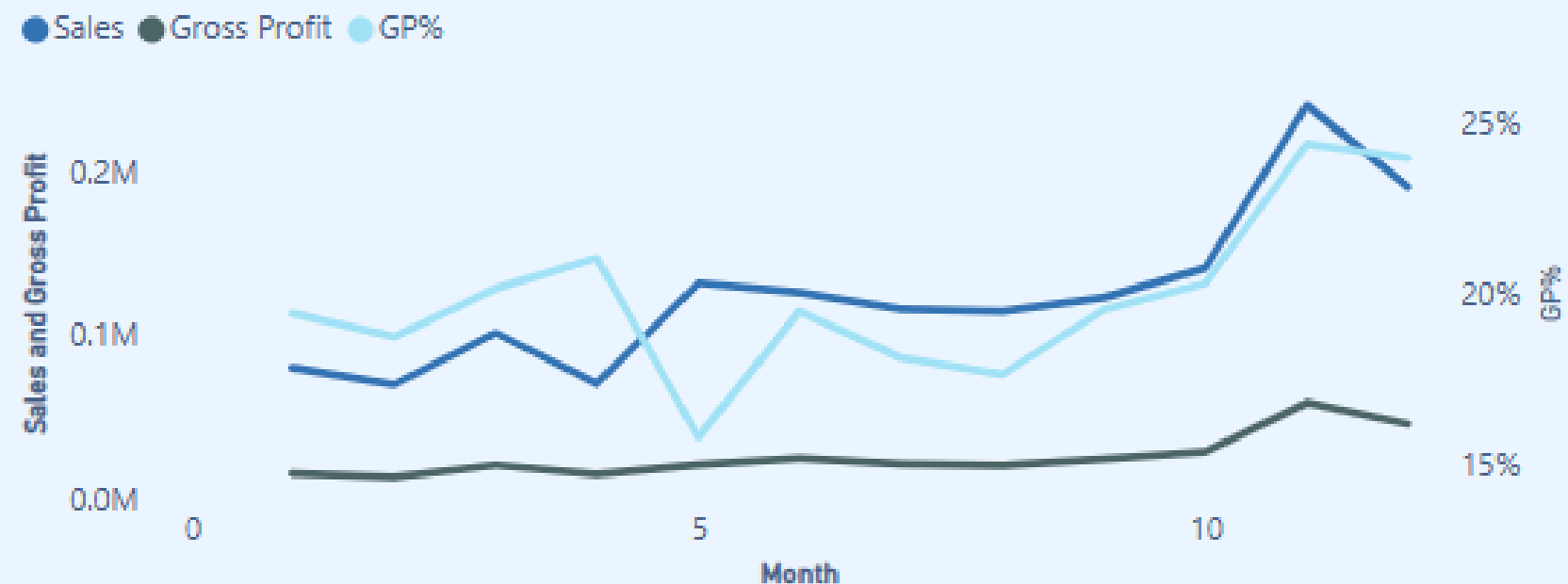
gained insights :

- we can see the impact of unit pricing on sales "Sales & unit price per month" Visual
-> I think we started with high pricing list compared to competitors

- price start decreasing at "May"
-> this has it's impact on GP% "decreased by (3-4)%"

- so far the pricing continued the same manner, but the increase in sales increased gross profit & GP%

Data Analysis Insights

- West and Other regions are bellow our average region sales which is near "280K"

- "Other" Region achieve low sales but high GP%

- we can cure this and increase sales and gross profit by reviewing states that are below our measures average
- Bottom 10 in the visual on the right
- can find others from the scatter visial

Sales & GP% by (Region - State)

Bottom 10 State by Sales

Power BI Dashboard

Performance & Profitability by Region

Gross Profit
Quantity
Sales

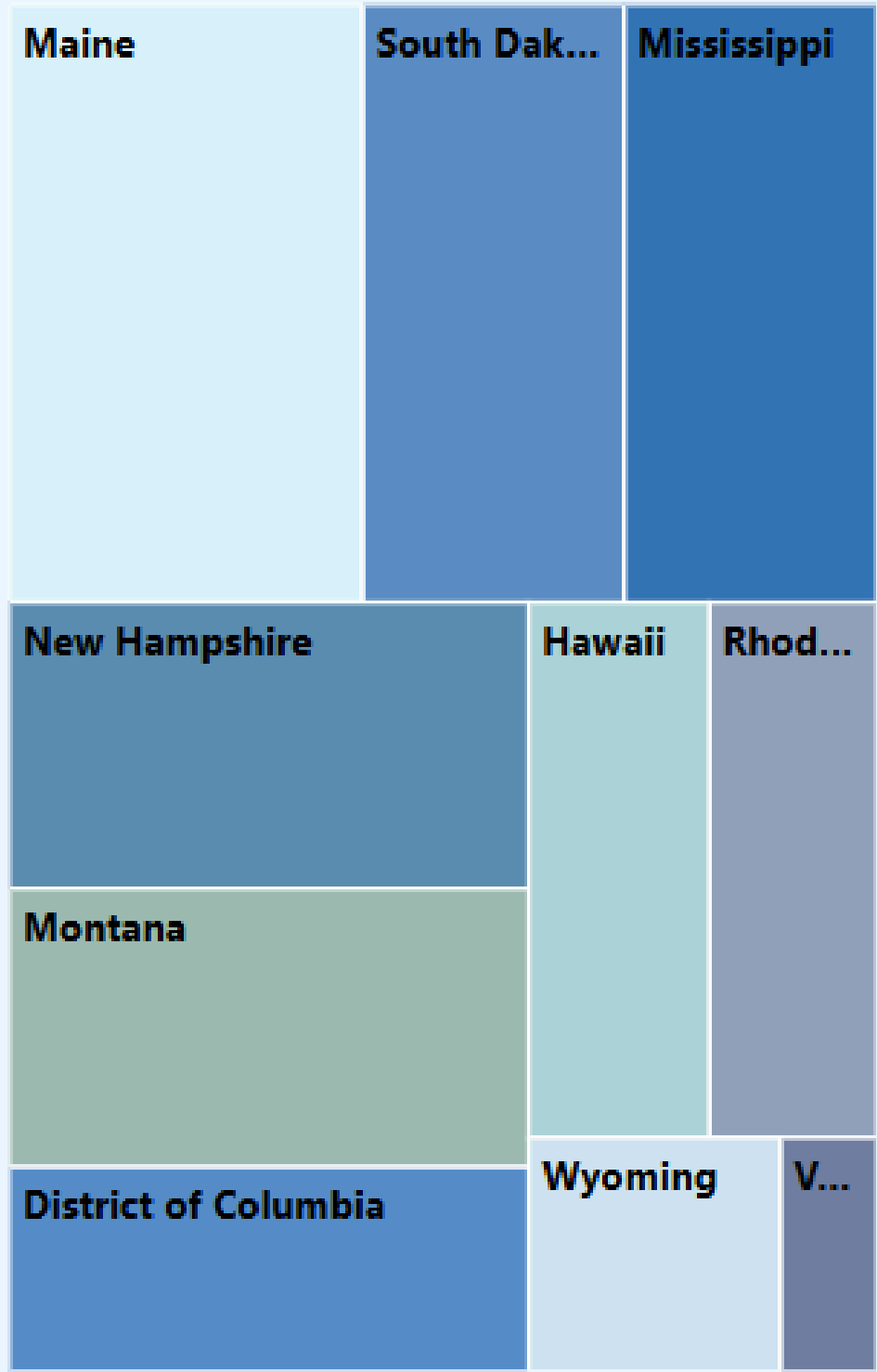**GP%**
20.43%

Total Sales
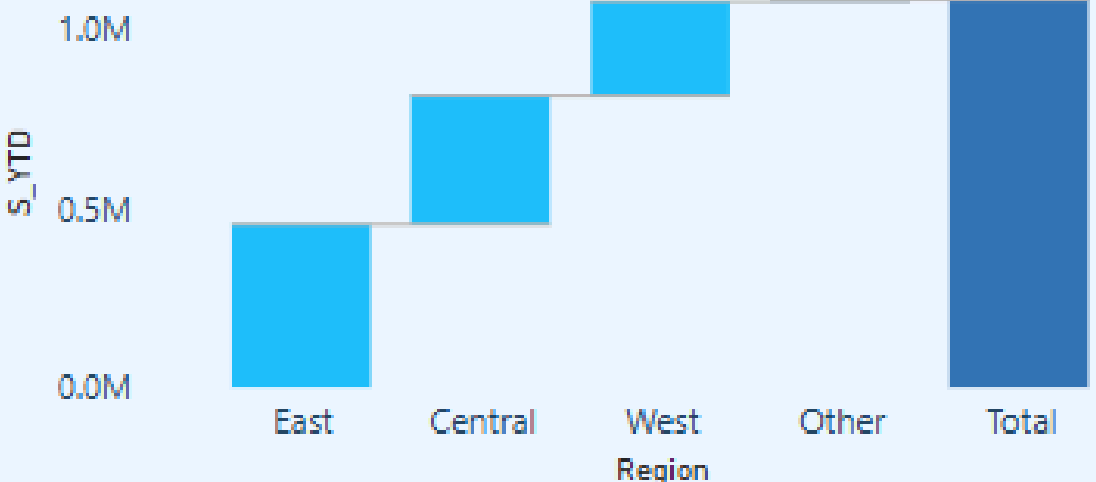## 1.38M

Retention Rate
71.98%

Bottom 10 State by Sales
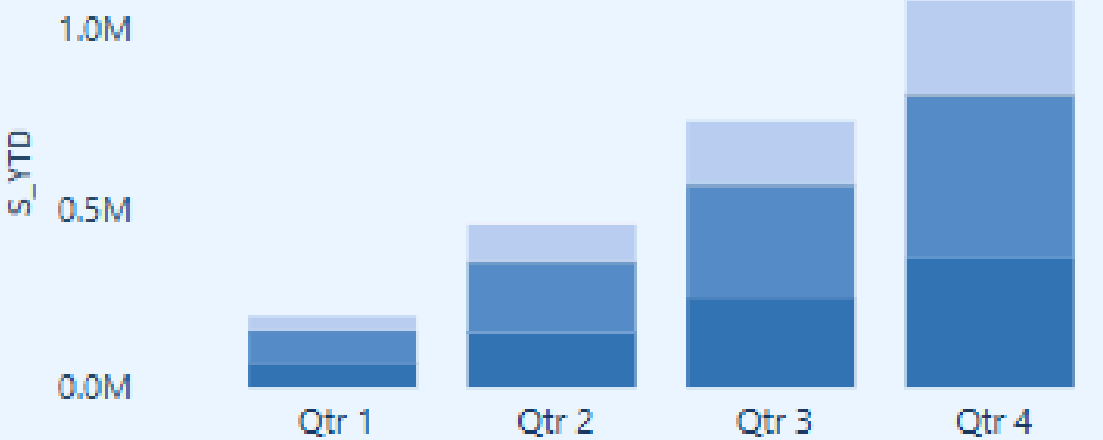

Sales YTD - Region - Month

● Increase ● Decrease ● Total

Sales YTD (Region) | Quarter

Region ● Central ● East ● Other ● West

Sales & GP% by (Region - State)
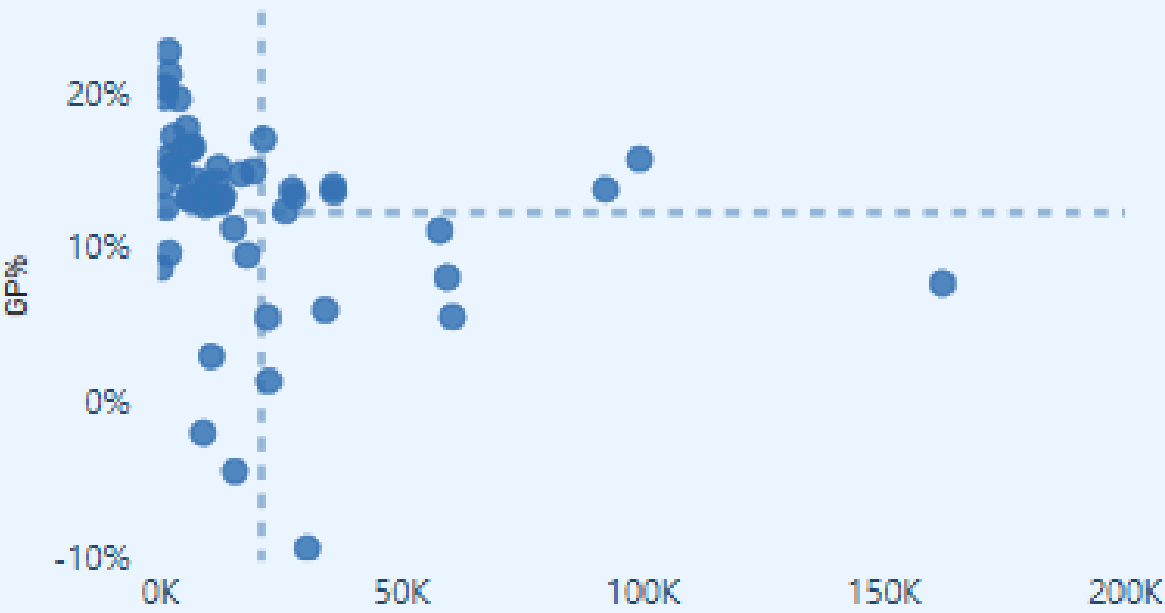
gained insights:

• The marketing plan works well in all regions as we see from the water fall and column charts each quarter is more than it's previous in all measures

• west region and some states in the other regions need more marketing campaigns to achieve market averages

   "review states under averages from the left chart "

Data Analysis Insights

Here are the Top and bottom products by Gross Profit:

- we may need to increase the stock of the top products

- we should also discover the problem of negative gross profit
  products it may be one of :
  - 1-high cost price "over it's price in the market "
  - 2-high shipping cost that we can't make the customer bear it
  - 3-they are unwanted products to the market
    and only sold on sale

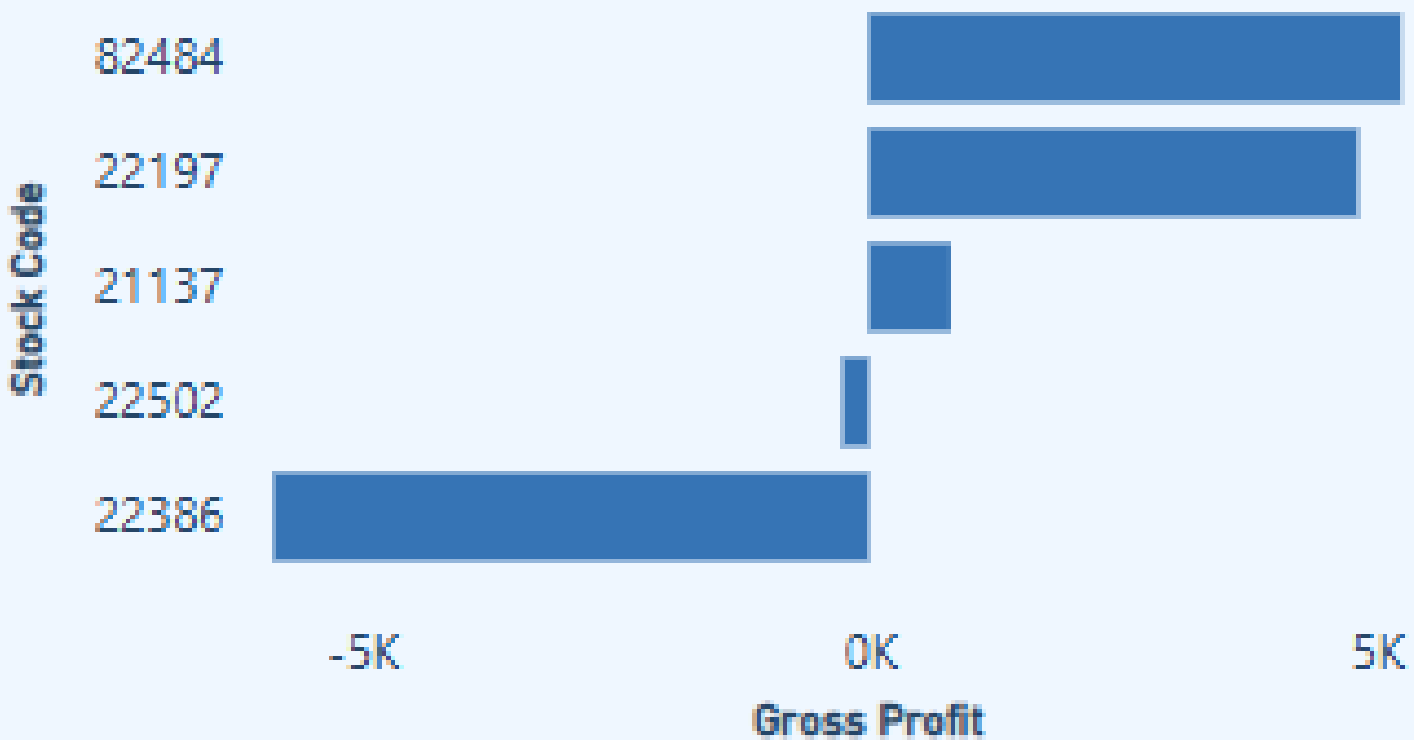| Total Quantity Sold	Avg Selling Price	Sales Velocity	Return %
75K	20.10	245	1.96%

All Products KPIs
- the sales velocity is 245 quantity each work day
- our returns are a small percentage of total sales
  this reflects customers satisfaction

Top 5 Products by GP%
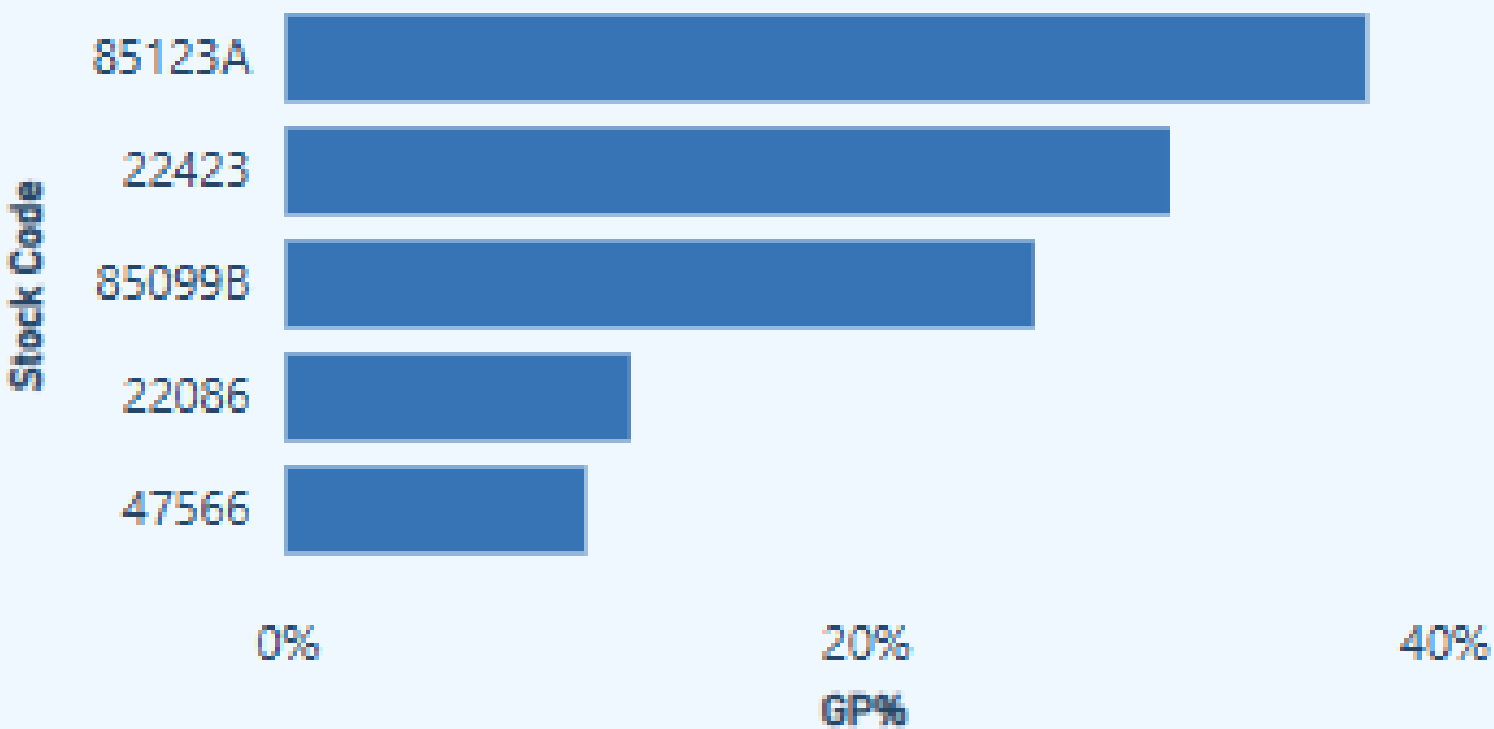
Bottom 5 Products by Gross Profit

Power BI Dashboard

Products analysis & Performance
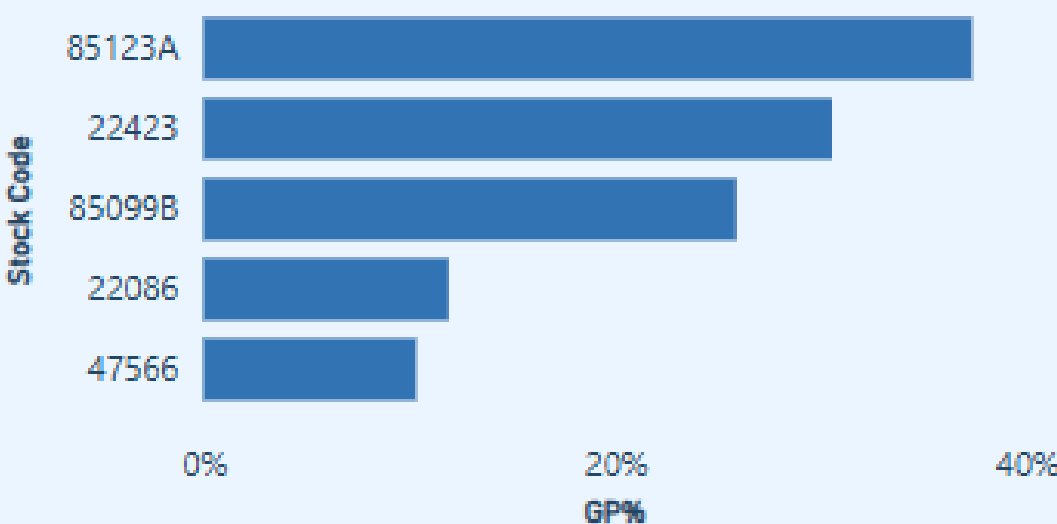
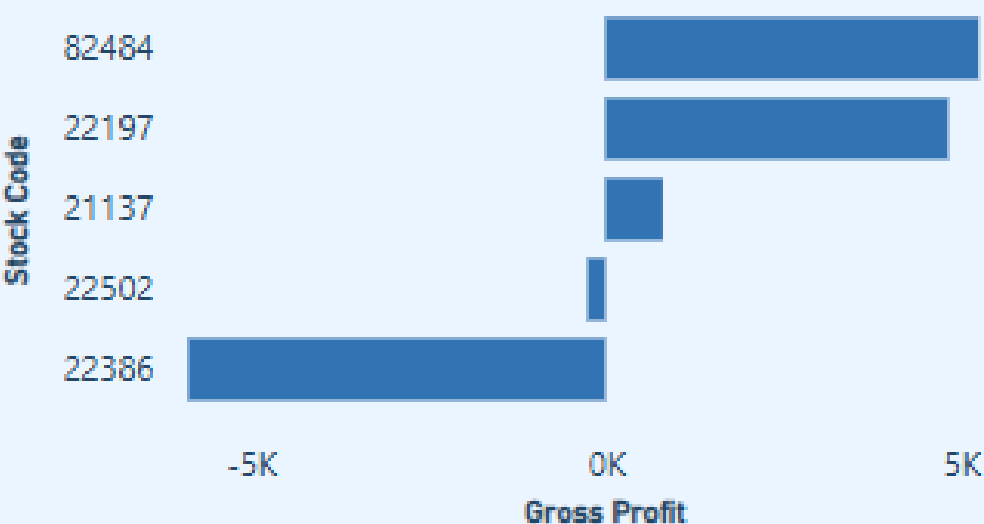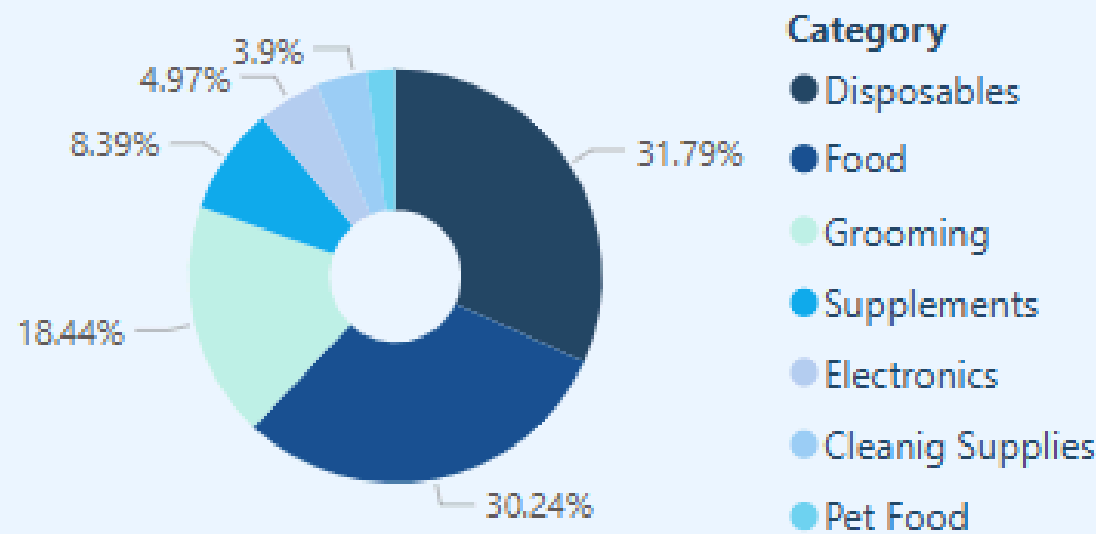| Total Quantity Sold	Avg Selling Price	Sales Velocity	Return %
75K	**20.10**	**245**	**1.96%**

Top 5 Products by GP%

Bottom 5 Products by Gross Profit

Gross Profit by Category

Description	Stock Code	Sales	Quantity	Gross Profit	GP%
Taste of the Wild High Prairie Grain-Free Dry Dog Food 40lb	22423	$263,820	3331	80614.83	30.56%
Dog and Puppy Pads	85123A	$128,444	7313	48000.52	37.37%
Earth Rated Dog Poop Bags	85099B	$107,531	8856	27826.75	25.88%
ChomChom Pet Hair Remover - Reusable Cat and Dog Hair Remover	22114	$41,732	1233	25702.86	61.59%
Purina Pro Plan Adult Sensitive Skin	23284	$59,230	1291	16626.96	28.07%
UltraSound Dog Barking Deterrent	22720	$64,321	1952	15520.61	24.13%
Rechargeable Pet Nail Grinder	22960	$49,413	1766	14093.32	28.52%
Memory Foam Pet Beds for Small, Medium, and Large Dogs and Cats	47566	$126,704	3786	13124.26	10.36%
Pet Odor Eliminator	84879	$65,485	6688	11981.41	18.30%
Pet Grooming Brush	20725	$45,589	3908	10416.60	22.85%
ProBiotic Supplements for Dogs	79321	$66,652	1984	9116.50	13.68%
Total		**$1,502,079**	**74729**	**306860.19**	**20.43%**

Gained insights:

- there are some product achieved a negative Gross profit.
-->we may need to review it's cost, our price and competitor selling price

- some products achieve positive numbers but less than the market average

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Power BI Dashboard

Customer Sales & Retention Metrics

State -> City

All

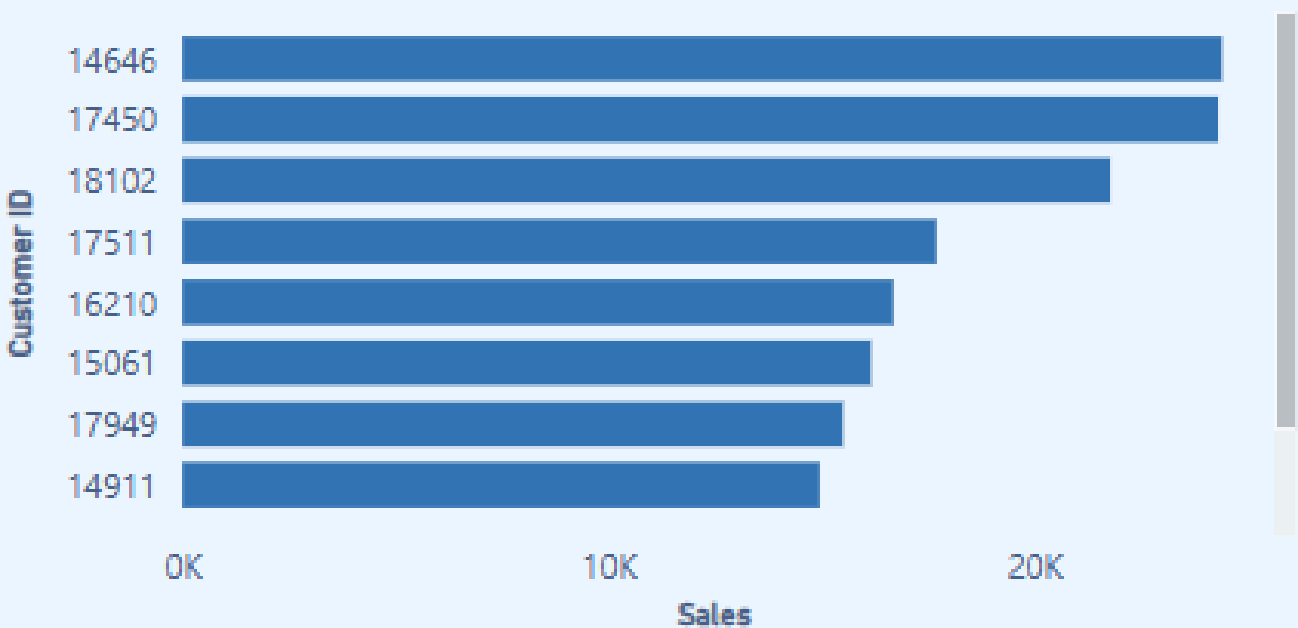### Top 10 customer by Sales

Customer ID: 14646, 17450, 18102, 17511, 16210, 15061, 17949, 14911

Sales: 0K, 10K, 20K

Retention Rate by Month

Retention Rate: 30%, 25%, 20%, 15%, 10%

10.73% 14.14% 12.21% 16.99% 15.12% 13.95% 18.76% 20.52% 26.40% 18.94%

Month: 0, 5, 10

Average Purchase per Customer

$477.5

Count of Customers by Region

0.6%
23.05%
44.15%
32.2%

Region
● East
● Central
● West
● Other
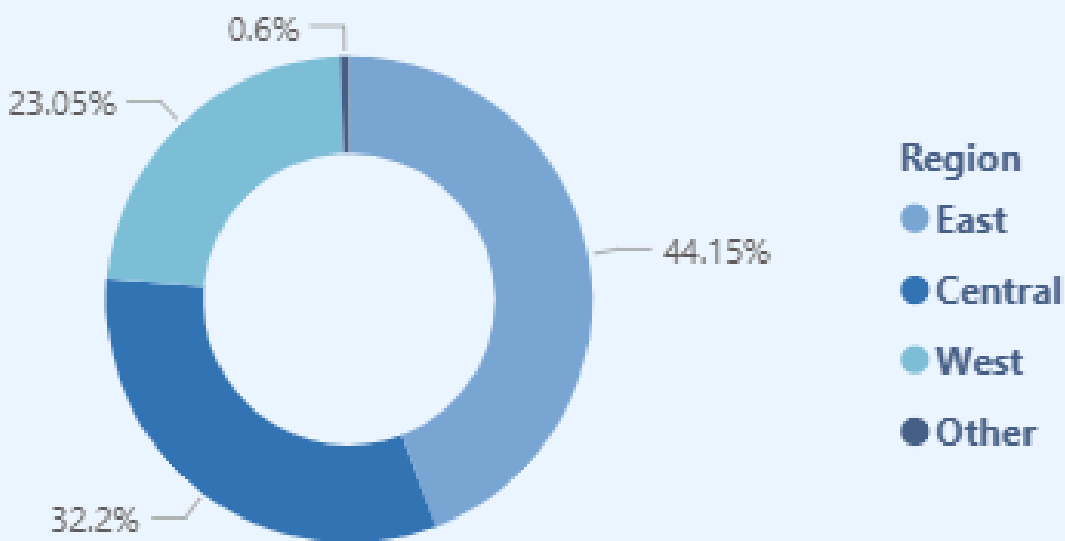
Count of Customers and by State

NORTH AMERICA

Pacific Ocean

Atlantic Ocean

Microsoft Bing

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Average Order Quantity per Customer

24
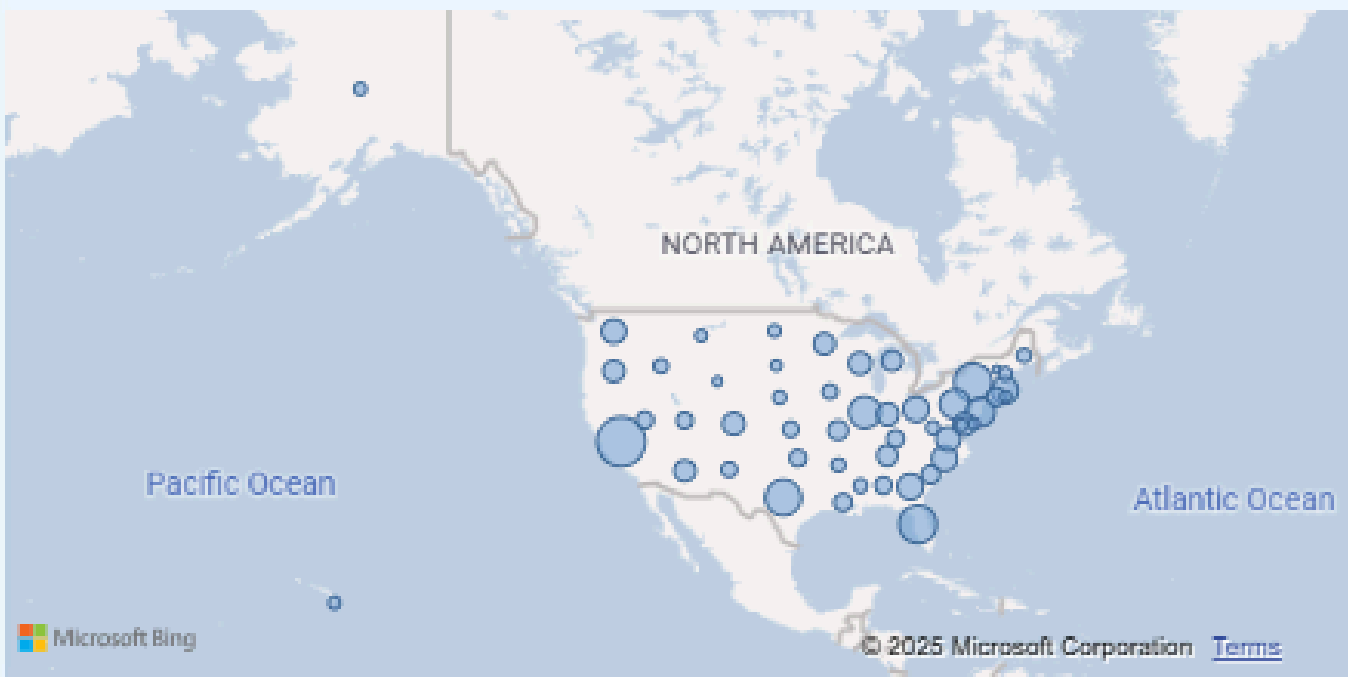
Total Retention Rate

72.0%

Key Takeaways

Summary of your insight:

- Some products need to be reviewed "achieve negative & below average measures"
- we can't sell them with a profitable price

- the market still need more marketing work in half of states it sell in it "for more popularity& increasing customers"
- the plan we use achieve high numbers but not the best for all states

business decision strategy to solve Products issues:

- Identify products with negative and below-average performance using Product performance dashboard
- Analyze their costs (landed cost, shipping, unit price) vs. selling price
- Consider renegotiating supplier costs or adjusting pricing strategy
- If still unprofitable, phase them out and replace them with higher-margin alternatives.

business decision strategy to solve low-performing states issues:

- Use profitability by region dashboard to identify which states need more marketing focus
- Implement regional promotions and localized campaigns.
- Test different pricing models per region based on purchasing power and competition.
- Reduce inventory costs in low-performing areas to minimize losses.