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LAB EXERCISE 1

GROUP 1:

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


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Data Analysis

Completeness

We identified a completeness issue in the dataset. Specifically, the Postal Code column contained 11 missing entries (Figure 1).

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Custor	Custor	Segme	Count	City	State	Postal Code	Region
2235	CA-2021-104066	2021-12-05	2021-12-10	Standard Class	QJ-19255	Quincy Jo	Corporate	United Sta	Burlington	Vermont		East
9147	US-2020-165505	2020-01-23	2020-01-27	Standard Class	CB-12535	Claudia B	Corporate	United Sta	Burlington	Vermont		East
9389	US-2021-127292	2021-01-19	2021-01-23	Standard Class	RM-19375	Raymond	Consumer	United Sta	Burlington	Vermont		East
9148	US-2020-165505	2020-01-23	2020-01-27	Standard Class	CB-12535	Claudia B	Corporate	United Sta	Burlington	Vermont		East
9742	CA-2019-117086	2019-11-08	2019-11-12	Standard Class	QJ-19255	Quincy Jo	Corporate	United Sta	Burlington	Vermont		East
5275	CA-2019-162887	2019-11-07	2019-11-09	Second Class	SV-20785	Stewart Vi	Consumer	United Sta	Burlington	Vermont		East
9390	US-2021-127292	2021-01-19	2021-01-23	Standard Class	RM-19375	Raymond	Consumer	United Sta	Burlington	Vermont		East
9387	US-2021-127292	2021-01-19	2021-01-23	Standard Class	RM-19375	Raymond	Consumer	United Sta	Burlington	Vermont		East
9388	US-2021-127292	2021-01-19	2021-01-23	Standard Class	RM-19375	Raymond	Consumer	United Sta	Burlington	Vermont		East
8799	US-2020-150140	2020-04-06	2020-04-10	Standard Class	VM-21685	Valerie Mi	Home Off	United Sta	Burlington	Vermont		East
9149	US-2020-165505	2020-01-23	2020-01-27	Standard Class	CB-12535	Claudia B	Corporate	United Sta	Burlington	Vermont		East

Figure 1: Missing Values (Postal Codes)

Consistency

We discovered an inconsistency related to the format of Postal Codes. While examining the dataset, we observed that some Postal Code entries contained only four digits (Figure 2). Further investigation revealed that these entries should have included five digits, with a leading zero. Unfortunately, this leading zero was dropped during the conversion of the dataset to a .csv file.

Order ID	Order Date	Ship Date	Ship Mode	Custor	Custor	Segme	Count	City	State	Postal Code	Region
CA-2019-146087	2019-07-06	2019-07-11	Standard	PP-18955	Paul Prost	Home Off	United Sta	Holyoke	Massachu	1040	East
CA-2019-117961	2019-11-26	2019-11-30	Standard	GP-14740	Guy Phon	Corporate	United Sta	Leominste	Massachu	1453	East
CA-2019-117961	2019-11-26	2019-11-30	Standard	GP-14740	Guy Phon	Corporate	United Sta	Leominste	Massachu	1453	East
CA-2020-154998	2020-04-07	2020-04-09	First Class	ES-14080	Erin Smith	Corporate	United Sta	Lakewood	New Jerse	8701	East
CA-2021-166499	2021-03-19	2021-03-20	First Class	VG-21805	Vivek Grac	Corporate	United Sta	Lakewood	New Jerse	8701	East
CA-2019-152611	2019-02-20	2019-02-23	Second Cl	KA-16525	Kelly Andr	Consumer	United Sta	Perth Am	New Jerse	8861	East
CA-2021-132647	2021-02-17	2021-02-23	Standard	GH-14410	Gary Hans	Home Off	United Sta	Perth Am	New Jerse	8861	East
CA-2021-132647	2021-02-17	2021-02-23	Standard	GH-14410	Gary Hans	Home Off	United Sta	Perth Am	New Jerse	8861	East
CA-2021-161984	2021-04-10	2021-04-15	Standard	SJ-20125	Sanjit Jacc	Home Off	United Sta	New Brun	New Jerse	8901	East
CA-2021-161984	2021-04-10	2021-04-15	Standard	SJ-20125	Sanjit Jacc	Home Off	United Sta	New Brun	New Jerse	8901	East
CA-2020-106075	2020-09-18	2020-09-23	Standard	HM-14980	Henry Mai	Consumer	United Sta	New York	New York	10009	East
CA-2021-161018	2021-11-09	2021-11-11	Second Cl	PN-18775	Parhena N	Home Off	United Sta	New York	New York	10009	East
CA-2019-137225	2019-12-15	2019-12-19	Standard	JK-15640	Jim Kriz	Home Off	United Sta	New York	New York	10009	East

Figure 2: Examples of 4 digits Postal Codes

Apart from the Postal Codes format issue, our analysis did not uncover any other inconsistencies within the dataset. The data appears to be consistent in terms of formatting, units, and other key attributes.

Redundancies

Our assessment did not reveal any instances of redundant data.

Duplicates

We identified a case of duplicate data, where the same order was recorded twice (Figure 3).

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Custor	Custor	Postal C	Produ	Categ	Sub-C	Product Name	Sales	Quant	Discou	Profit
3406	US-2018-150119	2018-04-23	2018-04-27	Standard Class	LB-16795	Laurel Bell	43229	FUR-CH-1	Furniture	Chairs	Global Leather Highback Executive Chair with Pr	281.372	2	0.3	-12.0588
3407	US-2018-150119	2018-04-23	2018-04-27	Standard Class	LB-16795	Laurel Bell	43229	FUR-CH-1	Furniture	Chairs	Global Leather Highback Executive Chair with Pr	281.372	2	0.3	-12.0588
3408	US-2018-150119	2018-04-23	2018-04-27	Standard Class	LB-16795	Laurel Bell	43229	OFF-BI-10	Office Sup	Binders	Zipper Ring Binder Pockets	7.488	8	0.7	-5.2416
3409	US-2018-150119	2018-04-23	2018-04-27	Standard Class	LB-16795	Laurel Bell	43229	FUR-FU-11	Furniture	Furnishing	G.E. Halogen Desk Lamp Bulbs	22.336	4	0.2	7.8176

Figure 3: Duplicate Data

Target Audience

Operational Report

The operational report is primarily designed for the Sales Team. This report serves as a crucial resource for the dedicated members of the Sales Team, who are responsible for overseeing sales performance within their respective state in regional offices. Its primary objective is to facilitate efficient monitoring and control of sales activities. By providing key performance metrics and insights over a monthly timeframe, it empowers the Sales Team to ensure that sales targets are consistently met and that business processes run smoothly within the context of the defined period.

Executive Report

The executive report is directed towards Regional Managers. This specialized report caters to the informational needs of Regional Managers, who hold a pivotal role in strategic decision-making. By offering comprehensive insights into sales performance, profitability, and areas requiring improvement, such as returns, this report equips Regional Managers with the data required to make informed and impactful decisions. It serves as a valuable resource for enhancing overall sales operations and profitability, aligning the organization's goals with strategic actions at the regional level.

Context and Additional Assumptions

- High-level management will consult executive reports when making strategic decisions.
- Employees immediately involved in sales and order processing will use operational reports.
- Executive and operational reports will be created for each designated region.
- The profits for some orders were negative because of the discounts on the products.
- Both reports will be produced on a regular basis, either monthly or quarterly.
- The data in the Sample Superstore spreadsheet is taken to be an accurate representation of the sales data for the business.
- Reports will be kept up to date with recent information on a regular basis.

Operational and Executive Reports

Operational Report

The operational report is designed to provide a comprehensive overview of sales activities during the specified report period. The report format includes the following key elements:

- **Report Period:** The operational report captures data over a defined period (monthly), allowing frequent assessment of sales performance.
- **Region, State, City, Sub-category, and Item Name:** These categorical elements serve as the basis for a detailed breakdown of sales data, enabling a thorough analysis of product performance across different dimensions.
- **Previous Sales (\$):** This column represents the total sales amount of the item in the state for the previous period (month).
- **Current Sales (\$):** This column represents the total sales amount of the item in the state for the current period (month).
- **Quantity:** This column represents total item sold in the state in the current period (month)
- **Profit (\$):** This column represents the financial outcome of each sale, accounting for expenses and discounts.
- **Sales Growth Rate (%):** This column calculates the percentage change in sales between the previous and current month, aiding in performance evaluation.
$$\text{Sales Growth Rate (\%)} = (\text{Current Sales} - \text{Previous Sales} / \text{Previous Sales}) * 100$$
- **Sub-Total Rows:** Sub-total rows are included for each sub-category and item name, presenting aggregated figures for a quick summary of performance within specific product categories and items.
- **Total Row:** The total row displays cumulative figures for the entire report period, offering a holistic view of selected sales performance.

Executive Report

The executive report is focused on presenting quarterly gross sales data. The report structure encompasses the following elements:

- **Region:** The region section specifies the geographic scope of the report.
- **State:** This column represents insights into sales at the state level.
- **Sales by Quarter (\$):** These columns represent the sales figures for the previous quarter, the current quarter, and the corresponding percentage change. Additionally, it presents sales figures for the same quarter in the previous year and the percentage change.
- **Net Profit Margin Ratio (%):** This column represents the percentage of profit earned from each dollar of sales. It is a key financial metric that measures the profitability of a business by indicating how much profit is generated for each dollar of sales.
$$\text{Net Profit Margin Ratio} = (\text{Net Profit} / \text{Total Sales}) * 100$$
- **Discount Effective Rate (%):** This column represents the percentage of the total sales revenue that is attributed to discounts. It helps measure the impact of discounts on the overall sales revenue as a percentage.
$$\text{Discount Effective Rate} = ((\text{Total Sales with Discount} - \text{Total Sales without Discount}) / \text{Total Sales without Discount}) * 100$$

Empty Templates for Reports

Operational Report

Sales Team Operations by Monthly

Report Period: 03/01/2020 - 03/31/2020 {start date - end date}

Region	State	City	Sub-category	Item Name	Previous Sales (\$)	Current Sales (\$)	Quantity	Profit (\$)	Sales Growth Rate (%)	
			Sub-total							
			Sub-total							
			Sub-total							
			Sub-total							
			Sub-total							
			Sub-total							
			Sub-total							
	Sub-total									
Total										
Total										

Executive Report

Sales Team Quarterly Executive Report

Region: East {Selected Region}

State	Sales Q1-2020 {previous quarter} (\$)	Sales Q2-2020 {current quarter} (\$)	Sales Comparison Q2-2020 vs. Q1- 2020 (%)	Sales Q2-2019 {previous year} (\$)	Sales Comparison Q2-2020 {current year} vs. Q2-2019 (%)	Net Profit Margin Ratio (%)	Discount Effective Rate (%)
Total							