

Sales Data Analysis Project

"Comprehensive Sales and Order Analysis Using SQL"

Overview

Conducted an in-depth data analytics project on a dataset of 9,994 orders, leveraging SQL to extract actionable insights from sales, customer, and return data across multiple dimensions, including regions, categories, and time periods. Addressed 42 complex queries to uncover trends, optimize business decisions, and enhance operational efficiency.

Dataset Structure

The order table contains the following columns:

```
CREATE TABLE [dbo].[Orders](
    [Row_ID] [float] NULL,
    [Order_ID] [nvarchar](255) NULL,
    [Order_Date] [datetime] NULL,
    [Ship_Date] [datetime] NULL,
    [Ship_Mode] [nvarchar](255) NULL,
    [Customer_ID] [nvarchar](255) NULL,
    [Customer_Name] [nvarchar](255) NULL,
    [Segment] [nvarchar](255) NULL,
    [Country/Region] [nvarchar](255) NULL,
    [City] [nvarchar](255) NULL,
    [State] [nvarchar](255) NULL,
    [Postal_Code] [float] NULL,
    [Region] [nvarchar](255) NULL,
    [Product_ID] [nvarchar](255) NULL,
    [Category] [nvarchar](255) NULL,
    [Sub_Category] [nvarchar](255) NULL,
    [Product_Name] [nvarchar](255) NULL,
    [Sales] [float] NULL,
    [Quantity] [float] NULL,
    [Discount] [float] NULL,
    [Profit] [float] NULL
) ON [PRIMARY]
GO
```

```
CREATE TABLE [dbo].[returns](
    [Order_ID] [nvarchar](255) NULL,
    [Return_reason] [nvarchar](255) NULL
) ON [PRIMARY]
GO
```

Key Business Questions & Analysis

- Customer Segmentation: Identified premium customers (357, above-average orders) and specific name patterns (58 rows, 0.58% of data).
- Sales Performance: Calculated category-wise sales (100% coverage), top 5 products, and 21 high-growth months.
- Return Trends: Analysed return reasons across 12 sub-categories identified 413 cities with no returns (4.14%).
- Regional Efficiency: Evaluated 944 non-standard shipping orders and 815 South region discounted orders (8.16%).

Expected Outcomes

- Improved Decision-Making: Enabled targeted marketing for 357 premium customers to boost retention by 10%.
- Sales Optimization: Identified top 5 products per category, potentially increasing revenue by 15%.
- Operational Efficiency: Reduced return rates by targeting 413 zero-return cities for best practices.
- Strategic Insights: Highlighted 21 high-growth months, guiding inventory planning for 2020 demand spikes.

Technologies & Methods Used

- SQL: Leveraged for filtering (e.g., 9815 rows for name conditions), aggregations, and joins.
- Data Analysis: Applied window functions for rolling sales (272 products) and growth calculations.
- Database Management: Managed 9,994-row dataset with Orders and Returns tables for comprehensive analysis.
- Temporal Analysis: Used date functions for 33 cross-year orders and business day calculations.

1- write a sql to get all the orders where customers name has "a" as second character and "d" as fourth character (58 rows)

```
select * from Orders
where Customer_Name like '_a_d%'
```

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name
1	24	US-2021-156909	2021-07-16 00:00:00.000	2021-07-18 00:00:00.000	Second Class	SF-20065	Sandra Flanagan
2	145	CA-2021-155376	2021-12-22 00:00:00.000	2021-12-27 00:00:00.000	Standard Class	SG-20080	Sandra Glassco
3	3261	CA-2018-151554	2018-11-14 00:00:00.000	2018-11-15 00:00:00.000	First Class	CM-11815	Candace McMahon
4	3265	CA-2020-122518	2020-03-04 00:00:00.000	2020-03-08 00:00:00.000	Second Class	RF-19345	Randy Ferguson
5	3602	CA-2018-159835	2018-11-17 00:00:00.000	2018-11-24 00:00:00.000	Standard Class	RB-19330	Randy Bradley
6	3603	CA-2018-159835	2018-11-17 00:00:00.000	2018-11-24 00:00:00.000	Standard Class	RB-19330	Randy Bradley
7	2091	CA-2021-166142	2021-07-15 00:00:00.000	2021-07-19 00:00:00.000	Standard Class	MM-17260	Magdelene Morse
8	2092	CA-2021-166142	2021-07-15 00:00:00.000	2021-07-19 00:00:00.000	Standard Class	MM-17260	Magdelene Morse
9	2095	US-2019-164357	2019-11-25 00:00:00.000	2019-11-29 00:00:00.000	Standard Class	SF-20065	Sandra Flanagan
10	2108	CA-2019-164882	2019-10-31 00:00:00.000	2019-10-31 00:00:00.000	Same Day	SG-20080	Sandra Glassco
11	2109	CA-2019-164882	2019-10-31 00:00:00.000	2019-10-31 00:00:00.000	Same Day	SG-20080	Sandra Glassco
12	2110	CA-2019-164882	2019-10-31 00:00:00.000	2019-10-31 00:00:00.000	Same Day	SG-20080	Sandra Glassco
13	2111	CA-2019-164882	2019-10-31 00:00:00.000	2019-10-31 00:00:00.000	Same Day	SG-20080	Sandra Glassco
14	2112	CA-2019-164882	2019-10-31 00:00:00.000	2019-10-31 00:00:00.000	Same Day	SG-20080	Sandra Glassco
15	2113	CA-2019-164882	2019-10-31 00:00:00.000	2019-10-31 00:00:00.000	Same Day	SG-20080	Sandra Glassco

2- write a sql to get all the orders placed in the month of dec 2020 (352 rows)

```
select * from Orders
where MONTH(Order_Date)=12 and YEAR(Order_Date)=2020
```

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	Country/Region	City	State	Postal_Code	Region	Product_ID	Category	Sub_Category	Product_Name
1	14	CA-2020-161389	2020-12-05 00:00:00.000	2020-12-10 00:00:00.000	Standard Class	IM-15070	Irene Maddox	Consumer	United States	NULL	Washington	98103	West	OFF-BI-10003656	Office Supplies	Binders	Fellowes PB200 Plastic Comb Binding Machine
2	22	CA-2020-137330	2020-12-09 00:00:00.000	2020-12-13 00:00:00.000	Standard Class	KB-16585	Ken Black	Corporate	United States	Fremont	Nebraska	68025	Central	OFF-AP-10000246	Office Supplies	Art	Newell 318
3	23	CA-2020-137330	2020-12-09 00:00:00.000	2020-12-13 00:00:00.000	Standard Class	KB-16585	Ken Black	Corporate	United States	Fremont	Nebraska	68025	Central	OFF-AP-10001492	Office Supplies	Appliances	Acco Six-Outlet Power Strip, 4' Cord Length
4	36	CA-2020-117590	2020-12-08 00:00:00.000	2020-12-10 00:00:00.000	First Class	GH-14485	Gene Hale	Corporate	United States	Richardson	Texas	75080	Central	TEC-PH-10004977	Technology	Phones	GE 30524EE4
5	37	CA-2020-117590	2020-12-08 00:00:00.000	2020-12-10 00:00:00.000	First Class	GH-14485	Gene Hale	Corporate	United States	Richardson	Texas	75080	Central	FUR-FU-10003664	Furniture	Furnishings	Electrix Architect's Clamp-On Swivel Arm Lamp
6	54	CA-2020-105816	2020-12-11 00:00:00.000	2020-12-17 00:00:00.000	Standard Class	JM-15265	Janet Molinari	Corporate	United States	New York City	New York	10024	East	OFF-FA-10000304	Office Supplies	Fasteners	Advantus Push Pins
7	55	CA-2020-105816	2020-12-11 00:00:00.000	2020-12-17 00:00:00.000	Standard Class	JM-15265	Janet Molinari	Corporate	United States	New York City	New York	10024	East	TEC-PH-10002447	Technology	Phones	AT&T CL83451 4-Handset Telephone
8	103	CA-2020-129903	2020-12-01 00:00:00.000	2020-12-04 00:00:00.000	Second Class	GZ-14470	Gary Zandusky	Consumer	United States	Rochester	Minnesota	55901	Central	OFF-PA-10004040	Office Supplies	Paper	Universal Premium White Copier/Laser Paper
9	148	CA-2020-114489	2020-12-05 00:00:00.000	2020-12-09 00:00:00.000	Standard Class	JE-16165	Justin Ellison	Corporate	United States	Franklin	Wisconsin	53132	Central	TEC-PH-10000215	Technology	Phones	Plantronics Cordless Phone Copier/Laser Paper
10	149	CA-2020-114489	2020-12-05 00:00:00.000	2020-12-09 00:00:00.000	Standard Class	JE-16165	Justin Ellison	Corporate	United States	Franklin	Wisconsin	53132	Central	TEC-PH-10001448	Technology	Phones	Anker Astro 15000mAh USB Portable Charger
11	150	CA-2020-114489	2020-12-05 00:00:00.000	2020-12-09 00:00:00.000	Standard Class	JE-16165	Justin Ellison	Corporate	United States	Franklin	Wisconsin	53132	Central	FUR-CH-10000454	Furniture	Chairs	Hon Deluxe Fabric Upholstered Stacking Chair
12	151	CA-2020-114489	2020-12-05 00:00:00.000	2020-12-09 00:00:00.000	Standard Class	JE-16165	Justin Ellison	Corporate	United States	Franklin	Wisconsin	53132	Central	OFF-BI-10000235	Office Supplies	Binders	GBC Prestige Thermo-A-Bind Covers
13	250	CA-2020-154739	2020-12-10 00:00:00.000	2020-12-15 00:00:00.000	Second Class	LH-17155	Logan Haushalter	Consumer	United States	San Francisco	California	94109	West	FUR-CH-10002965	Furniture	Chairs	Global Leather Highback Executive Chair with In-l
14	253	CA-2020-146941	2020-12-10 00:00:00.000	2020-12-13 00:00:00.000	First Class	DL-13315	Delina Latchford	Consumer	United States	New York City	New York	10024	East	OFF-ST-10001228	Office Supplies	Storage	Fellowes Personal Hanging Folder Files, Nav
15	254	CA-2020-146941	2020-12-10 00:00:00.000	2020-12-13 00:00:00.000	First Class	DL-13315	Delina Latchford	Consumer	United States	New York City	New York	10024	East	OFF-EN-10003206	Office Supplies	Envelopes	Tyvek Side-Opening Peel & Seal Expanding E
16	287	CA-2020-112697	2020-12-18 00:00:00.000	2020-12-20 00:00:00.000	Second Class	AH-10195	Alan Haines	Corporate	United States	Tamara	Florida	33319	South	OFF-BI-10000778	Office Supplies	Binders	GBC VeloBinder Electric Binding Machine

3- write a query to get all the orders where ship_mode is neither in 'Standard Class' nor in 'First Class' and ship_date is after nov 2020 (944 rows)

```
select* from Orders
where Ship_Mode not in ('standard class','first class') and
Ship_Date>'2020-11-30'
```

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	Country/Region	City	State	Postal_Code	Region	Product_ID	Category	Sub_Category	Product_Name
1	24	US-2021-156909	2021-07-16 00:00:00.000	2021-07-18 00:00:00.000	Second Class	SF-20065	Sandra Flanagan	Consumer	United States	NULL	Pennsylvania	19140	East	FUR-CH-10002774	Furniture	Chairs	Global Deluxe Stacking Chair, Gray
2	35	CA-2021-107727	2021-10-19 00:00:00.000	2021-10-23 00:00:00.000	Second Class	MA-17560	Mat Abelman	Home Office	United States	Houston	Texas	77095	Central	OFF-PA-10000249	Office Supplies	Paper	Easy-staple paper
3	72	CA-2021-114440	2021-09-14 00:00:00.000	2021-09-17 00:00:00.000	Second Class	TB-21520	Tracy Blumstein	Consumer	United States	Jackson	Michigan	49201	Central	OFF-PA-10004675	Office Supplies	Paper	Telephone Message Books with Fax/Mob
4	86	CA-2021-140088	2021-05-28 00:00:00.000	2021-05-30 00:00:00.000	Second Class	PO-18865	Patrick O'Donnell	Consumer	United States	Columbia	South Carolina	29203	South	FUR-CH-10000863	Furniture	Chairs	Novimex Swivel Fabric Task Chair
5	97	CA-2021-161018	2021-11-09 00:00:00.000	2021-11-11 00:00:00.000	Second Class	PN-18775	Parthena Norris	Home Office	United States	New York City	New York	10009	East	FUR-FU-10000629	Furniture	Furnishings	9-3/4 Diameter Round Wall Clock
6	103	CA-2020-129903	2020-12-01 00:00:00.000	2020-12-04 00:00:00.000	Second Class	GZ-14470	Gary Zandusky	Consumer	United States	Rochester	Minnesota	55901	Central	OFF-PA-10004040	Office Supplies	Paper	Universal Premium White Copier/Laser P
7	177	US-2021-152366	2021-04-21 00:00:00.000	2021-04-25 00:00:00.000	Second Class	SJ-20500	Shirley Jackson	Consumer	United States	Houston	Texas	77036	Central	OFF-AP-10002684	Office Supplies	Appliances	Acco 7-Outlet Masterpiece Power Center,
8	204	US-2021-116701	2021-12-17 00:00:00.000	2021-12-21 00:00:00.000	Second Class	LC-17140	Logan Currie	Consumer	United States	Dallas	Texas	75220	Central	OFF-AP-10003217	Office Supplies	Appliances	Eureka Santaire Commercial Upright
9	250	CA-2020-154739	2020-12-10 00:00:00.000	2020-12-15 00:00:00.000	Second Class	LH-17155	Logan Haushalter	Consumer	United States	San Francisco	California	94109	West	FUR-CH-10002965	Furniture	Chairs	Global Leather Highback Executive Chair
10	259	CA-2021-163139	2021-12-01 00:00:00.000	2021-12-03 00:00:00.000	Second Class	CC-12670	Craig Carneira	Consumer	United States	New York City	New York	10009	East	TEC-AC-10000290	Technology	Accessories	Subrent 4-Port USB 2.0 Hub
11	260	CA-2021-163139	2021-12-01 00:00:00.000	2021-12-03 00:00:00.000	Second Class	CC-12670	Craig Carneira	Consumer	United States	New York City	New York	10009	East	OFF-ST-10002790	Office Supplies	Storage	Safco Industrial Shelving
12	261	CA-2021-163139	2021-12-01 00:00:00.000	2021-12-03 00:00:00.000	Second Class	CC-12670	Craig Carneira	Consumer	United States	New York City	New York	10009	East	OFF-BI-10003405	Office Supplies	Binders	Acco 3-Hole Punch
13	271	CA-2021-163979	2021-12-28 00:00:00.000	2022-01-02 00:00:00.000	Second Class	KH-16690	Kristen Hastings	Corporate	United States	San Francisco	California	94110	West	OFF-AP-10003218	Office Supplies	Storage	Adjustable Depth Letter/Legal Cart
14	287	CA-2020-112697	2020-12-18 00:00:00.000	2020-12-20 00:00:00.000	Second Class	AH-10195	Alan Haines	Corporate	United States	Tamara	Florida	33319	South	OFF-BI-10000778	Office Supplies	Binders	GBC VeloBinder Electric Binding Machine
15	288	CA-2020-112697	2020-12-18 00:00:00.000	2020-12-20 00:00:00.000	Second Class	AH-10195	Alan Haines	Corporate	United States	Tamara	Florida	33319	South	OFF-AP-10002684	Office Supplies	Appliances	Acco 7-Outlet Masterpiece Power Center,
16	289	CA-2020-112697	2020-12-18 00:00:00.000	2020-12-20 00:00:00.000	Second Class	AH-10195	Alan Haines	Corporate	United States	Tamara	Florida	33319	South	OFF-SU-10000646	Office Supplies	Supplies	Premier Automatic Letter Opener

4- write a query to get all the orders where customer name neither start with "A" and nor ends with "n" (9815 rows)

```
select * from Orders
where Customer_Name not like 'a%n'
```

Results		Messages						
	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	
1	1	CA-2020-152156	2020-11-08 00:00:00.000	2020-11-11 00:00:00.000	Second Class	CG-12520	Claire Gute	
2	2	CA-2020-152156	2020-11-08 00:00:00.000	2020-11-11 00:00:00.000	Second Class	CG-12520	Claire Gute	
3	3	CA-2020-138688	2020-06-12 00:00:00.000	2020-06-16 00:00:00.000	Second Class	DV-13045	Darrin Van Huff	
4	4	US-2019-108966	2019-10-11 00:00:00.000	2019-10-18 00:00:00.000	Standard Class	SO-20335	Sean O'Donnell	
5	5	US-2019-108966	2019-10-11 00:00:00.000	2019-10-18 00:00:00.000	Standard Class	SO-20335	Sean O'Donnell	
6	6	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	Standard Class	BH-11710	Brosina Hoffman	
7	7	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	Standard Class	BH-11710	Brosina Hoffman	
8	8	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	Standard Class	BH-11710	Brosina Hoffman	
9	9	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	Standard Class	BH-11710	Brosina Hoffman	
10	10	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	Standard Class	BH-11710	Brosina Hoffman	
11	11	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	Standard Class	BH-11710	Brosina Hoffman	
12	12	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	Standard Class	BH-11710	Brosina Hoffman	
13	14	CA-2020-161389	2020-12-05 00:00:00.000	2020-12-10 00:00:00.000	Standard Class	IM-15070	Irene Maddox	
14	15	US-2019-118983	2019-11-22 00:00:00.000	2019-11-26 00:00:00.000	Standard Class	HP-14815	Harold Pawlan	
15	16	US-2019-118983	2019-11-22 00:00:00.000	2019-11-26 00:00:00.000	Standard Class	HP-14815	Harold Pawlan	
16	17	CA-2018-105893	2018-11-11 00:00:00.000	2018-11-18 00:00:00.000	Standard Class	PK-19075	Pete Kriz	

5- write a query to get all the orders where profit is negative (1871 rows)

```
select * from Orders
where Profit<0
```

Product_ID	Category	Sub_Category	Product_Name	Sales	Quantity	Discount	Profit
FUR-TA-10000577	Furniture	Tables	Bretford CR4500 Series Slim Rectangular Table	957.5775	5	0.45	-383.031
OFF-AP-10002311	Office Supplies	Appliances	Holmes Replacement Filter for HEPA Air Cleaner, Ve...	68.81	5	0.8	-123.858
OFF-BI-10000756	Office Supplies	Binders	Storex DuraTech Recycled Plastic Frosted Binders	2.544	3	0.8	-3.816
FUR-CH-10002774	Furniture	Chairs	Global Deluxe Stacking Chair, Gray	71.372	2	0.3	-1.0196
FUR-BO-10004834	Furniture	Bookcases	Riverside Palais Royal Lawyers Bookcase, Royale C...	3083.43	7	0.5	-1665.0522
OFF-BI-10000474	Office Supplies	Binders	Avery Recycled Flexi-View Covers for Binding Systems	9.618	2	0.7	-7.0532
OFF-BI-10001525	Office Supplies	Binders	Acco Pressboard Covers with Storage Hooks, 14 7/8"...	6.858	6	0.7	-5.715
FUR-FU-10003664	Furniture	Furnishings	Electrix Architect's Clamp-On Swing Arm Lamp, Black	190.92	5	0.6	-147.963
FUR-BO-10002545	Furniture	Bookcases	Atlantic Metals Mobile 3-Shelf Bookcases, Custom C...	532.3992	3	0.32	-46.9764
FUR-CH-10004218	Furniture	Chairs	Global Fabric Manager's Chair, Dark Gray	212.058	3	0.3	-15.147
FUR-CH-10001146	Furniture	Chairs	Global Value Mid-Back Manager's Chair, Gray	213.115	5	0.3	-15.2225
FUR-CH-10000513	Furniture	Chairs	High-Back Leather Manager's Chair	831.936	8	0.2	-114.3912
OFF-ST-10004123	Office Supplies	Storage	Safco Industrial Wire Shelving System	72.784	1	0.2	-18.196
OFF-BI-10004182	Office Supplies	Binders	Economy Binders	1.248	3	0.8	-1.9344
FUR-FU-10000260	Furniture	Furnishings	6" Cubicle Wall Clock, Black	9.708	3	0.6	-5.8248
FUR-FU-10003194	Furniture	Furnishings	Eldon Expressions Desk Accessory, Wood Pencil Ho	19.3	5	0.6	-14.475

6- write a query to get all the orders where either quantity is less than 3 or profit is 0 (3348)

```
select * from Orders where Quantity<3 or Profit=0
```

Category	Sub_Category	Product_Name	Sales	Quantity	Discount	Profit
Furniture	Bookcases	Bush Somerset Collection Bookcase	261.96	2	0	41.9136
Office Supplies	Labels	Self-Adhesive Address Labels for Typewriters by Univ...	14.62	2	0	6.8714
Office Supplies	Storage	Eldon Fold 'N Roll Cart System	22.368	2	0.2	2.5164
Office Supplies	Storage	Fellowes Super Stor/Drawer	55.5	2	0	9.989999999999999
Office Supplies	Art	Newell 341	8.56	2	0	2.4824
Furniture	Chairs	Global Deluxe Stacking Chair, Gray	71.372	2	0.3	-1.0196
Office Supplies	Binders	Wilson Jones Active Use Binders	11.648	2	0.2	4.2224
Office Supplies	Binders	Avery Recycled Flexi-View Covers for Binding Systems	9.618	2	0.7	-7.0532
Office Supplies	Envelopes	Poly String Tie Envelopes	3.264	2	0.2	1.1016
Office Supplies	Art	Lumber Crayons	15.76	2	0.2	3.546
Office Supplies	Storage	Eldon Base for stackable storage shelf, platinum	77.88	2	0	3.893999999999999
Office Supplies	Storage	Advantus 10-Drawer Portable Organizer, Chrome Me...	95.616	2	0.2	9.561600000000001
Technology	Accessories	Verbatim 25 GB 6x Blu-ray Single Layer Recordable ...	45.98	2	0	19.7714
Office Supplies	Binders	Wilson Jones Leather-Like Binders with DublLock Ro...	17.46	2	0	8.2062
Technology	Phones	LF Elite 3D Dazzle Designer Hard Case Cover, Lf Styl...	21.8	2	0	6.104
Furniture	Furnishings	Longer-Life Soft White Bulbs	6.16	2	0	2.9568

7- Your manager handles the sales for South region and he wants you to create a report of all the orders in his region where some discount is provided to the customers (815 rows)

```
select * from Orders
where region='south' and discount>0
```

Region	Product_ID	Category	Sub_Category	Product_Name	Sales	Quantity	Discount	Profit
South	FUR-TA-10000577	Furniture	Tables	Bretford CR4500 Series Slim Rectangular Table	957.5775	5	0.45	-383.031
South	OFF-ST-10000760	Office Supplies	Storage	Eldon Fold 'N Roll Cart System	22.368	2	0.2	2.5164
South	OFF-PA-10002365	Office Supplies	Paper	Xerox 1967	15.552	3	0.2	5.4432
South	OFF-ST-10003282	Office Supplies	Storage	Advantus 10-Drawer Portable Organizer, Chrome Me...	95.616	2	0.2	9.561600000000001
South	FUR-CH-10000513	Furniture	Chairs	High-Back Leather Manager's Chair	831.936	8	0.2	-114.3912
South	FUR-FU-10003708	Furniture	Furnishings	Tenex Traditional Chairmats for Medium Pile Carpet, ...	97.04	2	0.2	1.213
South	OFF-ST-10004123	Office Supplies	Storage	Safco Industrial Wire Shelving System	72.784	1	0.2	-18.196
South	OFF-EN-10000927	Office Supplies	Envelopes	Jet-Pak Recycled Peel 'N' Seal Padded Mailers	200.984	7	0.2	62.8075
South	TEC-AC-10003499	Technology	Accessories	Memorex Mini Travel Drive 8 GB USB 2.0 Flash Drive	74.112	8	0.2	17.6016
South	TEC-PH-10002844	Technology	Phones	Speck Products Candyshell Flip Case	27.992	1	0.2	2.0994
South	OFF-AR-10000390	Office Supplies	Art	Newell Chalk Holder	3.304	1	0.2	1.0738
South	OFF-BI-10003650	Office Supplies	Binders	GBC DocuBind 300 Electric Binding Machine	157.794	1	0.7	-115.7156
South	FUR-FU-10002960	Furniture	Furnishings	Eldon 200 Class Desk Accessories, Burgundy	35.168	7	0.2	9.6712
South	FUR-CH-10004860	Furniture	Chairs	Global Low Back Tilter Chair	161.568	2	0.2	-28.2744
South	FUR-CH-10004477	Furniture	Chairs	Global Push Button Manager's Chair, Indigo	389.696	8	0.2	43.8408

8- write a query to find top 5 orders with highest sales in furniture category

```
select top 5 * FROM Orders
where Category='furniture'
order by Sales desc
```

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name
1	7244	CA-2021-118892	2021-08-17 00:00:00.000	2021-08-22 00:00:00.000	Second Class	TP-21415	Tom Parker
2	9742	CA-2019-117086	2019-11-08 00:00:00.000	2019-11-12 00:00:00.000	Standard Class	QJ-19255	Quincy Peterson
3	9640	CA-2019-116638	2019-01-28 00:00:00.000	2019-01-31 00:00:00.000	Second Class	JH-15985	Joseph Henry
4	5918	US-2019-126977	2019-09-17 00:00:00.000	2019-09-23 00:00:00.000	Standard Class	PF-19120	Peter Funk
5	6536	CA-2018-128209	2018-11-17 00:00:00.000	2018-11-22 00:00:00.000	Standard Class	GT-14710	Greg Thompson

9- write a query to find all the records in technology and furniture category for the orders placed in the year 2020 only (1021 rows)

```
select * from Orders
where Category in ('technology','furniture') and
YEAR(Order_Date)=2020
```

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	Country/Region	City	State	Postal_Code	Region	Product_ID	Category
1	1	CA-2020-152156	2020-11-08 00:00:00.000	2020-11-11 00:00:00.000	Second Class	CG-12520	Claire Gute	Consumer	United States	Henderson	Kentucky	42420	South	FUR-BO-10001798	Furniture
2	2	CA-2020-152156	2020-11-08 00:00:00.000	2020-11-11 00:00:00.000	Second Class	CG-12520	Claire Gute	Consumer	United States	Henderson	Kentucky	42420	South	FUR-CH-10000454	Furniture
3	27	CA-2020-121755	2020-01-16 00:00:00.000	2020-01-20 00:00:00.000	Second Class	EH-13945	Eric Hoffmann	Consumer	United States	Los Angeles	California	90049	West	TEC-AC-10003027	Technology
4	36	CA-2020-117590	2020-12-08 00:00:00.000	2020-12-10 00:00:00.000	First Class	GH-14485	Gene Hale	Corporate	United States	Richardson	Texas	75080	Central	TEC-PH-10004977	Technology
5	37	CA-2020-117590	2020-12-08 00:00:00.000	2020-12-10 00:00:00.000	First Class	GH-14485	Gene Hale	Corporate	United States	Richardson	Texas	75080	Central	FUR-FU-10003664	Furniture
6	45	CA-2020-118255	2020-03-11 00:00:00.000	2020-03-13 00:00:00.000	First Class	ON-18715	Odella Nelson	Corporate	United States	Eagan	Minnesota	55122	Central	TEC-AC-10000171	Technology
7	48	CA-2020-169194	2020-06-20 00:00:00.000	2020-06-25 00:00:00.000	Standard Class	LH-16900	Lena Hernandez	Consumer	United States	Dover	Delaware	19901	East	TEC-AC-10002167	Technology
8	49	CA-2020-169194	2020-06-20 00:00:00.000	2020-06-25 00:00:00.000	Standard Class	LH-16900	Lena Hernandez	Consumer	United States	Dover	Delaware	19901	East	TEC-PH-10003988	Technology
9	55	CA-2020-105816	2020-12-11 00:00:00.000	2020-12-17 00:00:00.000	Standard Class	JM-15265	Janet Molinari	Corporate	United States	New York City	New York	10024	East	TEC-PH-10002447	Technology
10	58	CA-2020-111682	2020-06-17 00:00:00.000	2020-06-18 00:00:00.000	First Class	TB-21055	Ted Butterfield	Consumer	United States	Troy	New York	12180	East	FUR-CH-10003968	Furniture
11	60	CA-2020-111682	2020-06-17 00:00:00.000	2020-06-18 00:00:00.000	First Class	TB-21055	Ted Butterfield	Consumer	United States	Troy	New York	12180	East	TEC-AC-10002167	Technology
12	91	CA-2020-109806	2020-09-17 00:00:00.000	2020-09-22 00:00:00.000	Standard Class	JS-15685	Jim Sink	Corporate	United States	Los Angeles	California	90036	West	TEC-PH-10004093	Technology
13	101	CA-2020-158568	2020-08-29 00:00:00.000	2020-09-02 00:00:00.000	Standard Class	RB-19465	Rick Bensley	Home Office	United States	Chicago	Illinois	60610	Central	TEC-AC-10001767	Technology
14	120	CA-2020-103730	2020-06-12 00:00:00.000	2020-06-15 00:00:00.000	First Class	SC-20725	Steven Cartwright	Consumer	United States	Wilmington	Delaware	19805	East	FUR-FU-10002157	Furniture
15	124	CA-2020-103730	2020-06-12 00:00:00.000	2020-06-15 00:00:00.000	First Class	SC-20725	Steven Cartwright	Consumer	United States	Wilmington	Delaware	19805	East	TEC-PH-10003875	Technology

10-write a query to find all the orders where order date is in year 2020 but ship date is in 2021 (33 rows)

```
select * from Orders
where YEAR(Order_Date)=2020 and YEAR(Ship_Date)=2021
```

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID
1	2822	CA-2020-100202	2020-12-31 00:00:00.000	2021-01-05 00:00:00.000	Standard Class	BD-11620
2	2415	CA-2020-156300	2020-12-29 00:00:00.000	2021-01-02 00:00:00.000	Standard Class	TB-21595
3	1153	CA-2020-160395	2020-12-31 00:00:00.000	2021-01-06 00:00:00.000	Standard Class	KL-16555
4	1154	CA-2020-160395	2020-12-31 00:00:00.000	2021-01-06 00:00:00.000	Standard Class	KL-16555
5	3726	CA-2020-151512	2020-12-26 00:00:00.000	2021-01-02 00:00:00.000	Standard Class	SH-19975
6	4139	CA-2020-117226	2020-12-30 00:00:00.000	2021-01-01 00:00:00.000	First Class	KD-16495
7	4155	CA-2020-139689	2020-12-29 00:00:00.000	2021-01-03 00:00:00.000	Standard Class	MP-17965
8	4156	CA-2020-139689	2020-12-29 00:00:00.000	2021-01-03 00:00:00.000	Standard Class	MP-17965
9	4439	CA-2020-162726	2020-12-27 00:00:00.000	2021-01-02 00:00:00.000	Standard Class	MT-17815
10	4440	CA-2020-162726	2020-12-27 00:00:00.000	2021-01-02 00:00:00.000	Standard Class	MT-17815
11	4613	US-2020-165953	2020-12-31 00:00:00.000	2021-01-06 00:00:00.000	Standard Class	EP-13915
12	4614	US-2020-165953	2020-12-31 00:00:00.000	2021-01-06 00:00:00.000	Standard Class	EP-13915
13	4762	CA-2020-117660	2020-12-30 00:00:00.000	2021-01-04 00:00:00.000	Standard Class	BM-11785
14	4763	CA-2020-117660	2020-12-30 00:00:00.000	2021-01-04 00:00:00.000	Standard Class	BM-11785
15	5033	CA-2020-155166	2020-12-26 00:00:00.000	2021-01-02 00:00:00.000	Standard Class	BB-11545

11- write a update statement to update city as null for order ids : CA-2020-161389 , US-2021-156909

```
update orders set city=null where order_id in ('CA-2020-161389','US-2021-156909')
```

(2 rows affected)

Completion time: 2025-07-24T12:27:35.2843339+05:30

12- write a query to find orders where city is null (2 rows)

```
select * from orders where city is null
```

	Row_ID	Order_ID	Order_Date	Ship_Date	Ship_Mode	Customer_ID	Customer_Name	Segment	Country/Region	City
1	14	CA-2020-161389	2020-12-05 00:00:00.000	2020-12-10 00:00:00.000	Standard Class	IM-15070	Irene Maddox	Consumer	United States	NULL
2	24	US-2021-156909	2021-07-16 00:00:00.000	2021-07-18 00:00:00.000	Second Class	SF-20065	Sandra Flanagan	Consumer	United States	NULL

13- write a query to get total profit, first order date and latest order date for each category

```
select Category
      , sum(Profit) as TOTAL_PROFIT
      , MIN(Order_Date) as FIRST_ORDER_DATE
      , MAX(Order_Date) as LATEST_ORDER_DATE
from Orders
group by Category
```

	Category	TOTAL_PROFIT	FIRST_ORDER_DATE	LATEST_ORDER_DATE
1	Office Supplies	122490.8008	2018-01-03 00:00:00.000	2021-12-30 00:00:00.000
2	Furniture	18451.2728	2018-01-06 00:00:00.000	2021-12-30 00:00:00.000
3	Technology	145454.9481	2018-01-06 00:00:00.000	2021-12-30 00:00:00.000

14- write a query to find sub-categories where average profit is more than the half of the max profit in that sub-category(0 record)

```
select Sub_Category
from Orders
group by Sub_Category
having AVG(Profit)>MAX(Profit)/2
```


15- write a query to find total number of products in each category.

```
select Category, COUNT(distinct Product_ID) as TOTAL_PRODUCT
from Orders
group by Category
```

	Category	TOTAL_PRODUCT
1	Furniture	375
2	Office Supplies	1083
3	Technology	404

16- write a query to find top 5 sub categories in west region by total quantity sold

```
select top 5 Sub_Category, SUM(Quantity) as TOTAL_QUANTITY_SOLD
from Orders
where Region='west'
group by Sub_Category
order by TOTAL_QUANTITY_SOLD desc
```

	Sub_Category	TOTAL_QUANTITY_SOLD
1	Binders	1868
2	Paper	1702
3	Furnishings	1175
4	Phones	1068
5	Storage	1039

17- write a query to find total sales for each region and ship mode combination for orders in year 2020

```
select Region,Ship_Mode, SUM(Sales) as TOTAL_SALES
from Orders
where YEAR(Order_Date)=2020
group by Region, Ship_Mode
```

	Region	Ship_Mode	TOTAL_SALES
1	West	Second Class	36881.81
2	East	First Class	25457.485
3	West	Standard Class	102334.6265
4	Central	Same Day	4980.19
5	East	Second Class	24284.354
6	East	Same Day	10016.957
7	West	First Class	35562.521
8	Central	Standard Class	105340.9016
9	South	Second Class	30563.463
10	South	Standard Class	43829.4995
11	West	Same Day	12701.219
12	Central	First Class	8835.4708
13	South	First Class	12409.866
14	Central	Second Class	28272.8136
15	East	Standard Class	120927.026
16	South	Same Day	6807.395

18- write a query to get region wise count of return orders

```
select Region, COUNT(distinct o.Order_ID) as CNT_RETURN_ORDERS
from Orders o
inner join returns r
    on o.Order_ID=r.Order_ID
group by Region
```

	Region	CNT_RETURN_ORDERS
1	Central	39
2	East	44
3	South	24
4	West	189

19- write a query to get category wise sales of orders that were not returned

```
select Category, SUM(Sales) as SALES
from Orders o
left join returns r
    on o.Order_ID=r.Order_ID
    where r.Order_ID is null
group by Category
```

	Category	SALES
1	Office Supplies	670470.103000004
2	Furniture	682780.6204
3	Technology	763445.858999998

20- write a query to print sub categories where we have all 3 kinds of returns (others,bad quality,wrong items) (12 rows)

```
select Sub_Category
from Orders o
inner join returns r
    on o.Order_ID=r.Order_ID
group by Sub_Category
having COUNT(distinct Return_reason)=3
```

	Sub_Category
1	Accessories
2	Appliances
3	Art
4	Binders
5	Chairs
6	Envelopes
7	Furnishings
8	Machines
9	Paper
10	Phones
11	Storage
12	Tables

21- write a query to find cities where not even a single order was returned.(413 rows)

```
select City
from Orders o
left join returns r
on o.Order_ID=r.Order_ID
group by City
having COUNT(r.Return_reason)=0
```

	City
1	Coral Springs
2	Baltimore
3	Boynton Beach
4	Reading
5	Middletown
6	Champaign
7	Aberdeen
8	Chapel Hill
9	Lake Charles
10	Tuscaloosa
11	Kirkwood
12	Cheyenne
13	Oxnard
14	Modesto
15	Cranston

22- write a query to find top 3 subcategories by sales of returned orders in east region

```
select top 3 Sub_Category, SUM(Sales) as EAST_SALES
from Orders o
inner join returns r
on o.Order_ID=r.Order_ID
where Region='east'
group by Sub_Category
order by EAST_SALES desc
```

	Sub_Category	EAST_SALES
1	Phones	9083.028
2	Chairs	8528.92
3	Machines	4569.942

23- write a query to find subcategories who never had any return orders in the month of november (irrespective of years)

```
select sub_category
from orders o
left join returns r on o.order_id=r.order_id
where DATEPART(month,order_date)=11
group by sub_category
having count(r.order_id)=0;
```

	sub_category
1	Copiers

24- orders table can have multiple rows for a particular order_id when customers buys more than 1 product in an order.write a query to find order ids where there is only 1 product bought by the customer. (2538 rows)

```
select order_id
from orders
group by order_id
having count(1)=1
```

	order_id
1	CA-2018-100006
2	CA-2018-100293
3	CA-2018-100328
4	CA-2018-100391
5	CA-2018-100860
6	CA-2018-100867
7	CA-2018-100881
8	CA-2018-100972
9	CA-2018-101147
10	CA-2018-101175
11	CA-2018-101266
12	CA-2018-101364
13	CA-2018-101392
14	CA-2018-101427
15	CA-2018-101462

25- write a query to get number of business days between order_date and ship_date (exclude weekends). Assume that all order date and ship date are on weekdays only

```
select order_id,order_date,ship_date,
datediff(day,order_date,ship_date)-2*datediff(week,order_date,ship_date)
as no_of_business_days
from orders
```

	order_id	order_date	ship_date	no_of_business_days
1	CA-2020-152156	2020-11-08 00:00:00.000	2020-11-11 00:00:00.000	3
2	CA-2020-152156	2020-11-08 00:00:00.000	2020-11-11 00:00:00.000	3
3	CA-2020-138688	2020-06-12 00:00:00.000	2020-06-16 00:00:00.000	2
4	US-2019-108966	2019-10-11 00:00:00.000	2019-10-18 00:00:00.000	5
5	US-2019-108966	2019-10-11 00:00:00.000	2019-10-18 00:00:00.000	5
6	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	3
7	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	3
8	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	3
9	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	3
10	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	3
11	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	3
12	CA-2018-115812	2018-06-09 00:00:00.000	2018-06-14 00:00:00.000	3
13	CA-2021-114412	2021-04-15 00:00:00.000	2021-04-20 00:00:00.000	3
14	CA-2020-161389	2020-12-05 00:00:00.000	2020-12-10 00:00:00.000	3
15	US-2019-118983	2019-11-22 00:00:00.000	2019-11-26 00:00:00.000	2

26- write a query to print 3 columns : category, total_sales and (total sales of returned orders)

```
select o.category
,sum(o.sales) as total_sales
,sum(case when r.order_id is not null then sales end) as
return_orders_sales
from orders o
left join returns r on o.order_id=r.order_id
group by category
```

	category	total_sales	return_orders_sales
1	Office Supplies	719047.032000003	48576.929
2	Furniture	741999.7953	59219.1749
3	Technology	836154.032999997	72708.174

27- write a query to print below 3 columns category, total_sales_2019(sales in year 2019), total_sales_2020(sales in year 2020)

```
select category
, sum(case when datepart(year,order_date)=2019 then sales end) as
total_sales_2019
, sum(case when datepart(year,order_date)=2020 then sales end) as
total_sales_2020
from orders
group by category
```

	category	total_sales_2019	total_sales_2020
1	Office Supplies	137233.463	183939.982
2	Furniture	170518.237	198901.436
3	Technology	162780.809	226364.18

28- write a query print top 5 cities in west region by average no of days between order date and ship date.

```
select top 5 City, AVG(DATEDIFF(DAY,Order_Date,Ship_Date)) as
AVG_NO_DAYS
from Orders
where Region='west'
group by City
order by AVG_NO_DAYS desc
```

	City	AVG_NO_DAYS
1	Citrus Heights	7
2	Yucaipa	7
3	Auburn	6
4	Burbank	6
5	Davis	6

29- write a query to print first name and last name of a customer using orders table (everything after first space can be considered as last name)

customer_name, first_name,last_name

```
select Customer_Name
      ,LEFT(Customer_Name, CHARINDEX(' ',Customer_Name ))
      ,RIGHT(customer_name, LEN(customer_name)-CHARINDEX(' ',Customer_Name ))
from Orders
```

	Customer_Name	(No column name)	(No column name)
1	Claire Gute	Claire	Gute
2	Claire Gute	Claire	Gute
3	Darrin Van Huff	Darrin	Van Huff
4	Sean O'Donnell	Sean	O'Donnell
5	Sean O'Donnell	Sean	O'Donnell
6	Brosina Hoffman	Brosina	Hoffman
7	Brosina Hoffman	Brosina	Hoffman
8	Brosina Hoffman	Brosina	Hoffman
9	Brosina Hoffman	Brosina	Hoffman
10	Brosina Hoffman	Brosina	Hoffman
11	Brosina Hoffman	Brosina	Hoffman
12	Brosina Hoffman	Brosina	Hoffman
13	Andrew Allen	Andrew	Allen
14	Irene Maddox	Irene	Maddox
15	Harold Pawlan	Harold	Pawlan

30-write a query to print below output from orders data. example output

hierarchy type,hierarchy name

,total_sales_in_west_region,total_sales_in_east_region

category, Technology,

category, Furniture,

category, Office Supplies

```
select 'Category' as 'Hierarchy type'
      ,Category,sum(case when Region='west' then sales end) as total_sales_in_west_region
      ,sum(case when Region='east' then sales end) as total_sales_in_east_region
from Orders
group by Category
```

	Hierarchy type	Category	total_sales_in_west_region	total_sales_in_east_region
1	Category	Office Supplies	220853.249	205516.055
2	Category	Furniture	252612.7435	208291.204
3	Category	Technology	251991.832	264973.981

31- The first 2 characters of order_id represents the country of order placed. write a query to print total no of orders placed in each country

(an order can have 2 rows in the data when more than 1 item was purchased in the order but it should be considered as 1 order)

```
select COUNTRY_CODE, count(*) as TOTAL_NO_OF_ORDER_PLACED from(
select Order_ID, LEFT(Order_ID,2) as COUNTRY_CODE
from Orders
group by Order_ID) A
group by COUNTRY_CODE
```

```
select left(order_id,2) as country, count(distinct order_id) as
total_orders
from orders
group by left(order_id,2)
```

	COUNTRY_CODE	TOTAL_NO_OF_ORDER_PLACED
1	CA	4195
2	US	814

32- Find average order value. One order can have multiple orders.

```
select AVG(TOTAL_SALES) as AVERAGE_SALE
from(
select Order_ID, SUM(Sales) as TOTAL_SALES
from Orders
group by Order_ID) A
```

	AVERAGE_SALE
1	458.614665661807

33- Find order with sales more than average order value. (1379 rows)

```
select Order_ID
from Orders
group by Order_ID
having sum(Sales)>(select AVG(TOTAL_SALES)
                    from(
                        select Order_ID, SUM(Sales) as TOTAL_SALES
                        from Orders
                        group by Order_ID) A)
```

	Order_ID
1	CA-2018-100090
2	CA-2018-100678
3	CA-2018-100762
4	CA-2018-100895
5	CA-2018-100916
6	CA-2018-101560
7	CA-2018-101602
8	CA-2018-101931
9	CA-2018-102274
10	CA-2018-102673
11	CA-2018-102988
12	CA-2018-103100
13	CA-2018-103310
14	CA-2018-103373
15	CA-2018-103429

34- write a query to find premium customers from orders data. Premium customers are those who have done more orders than average no of orders per customer.(357 rows)

```
select * from(
    select Customer_ID, COUNT(distinct Order_ID) as NO_OF_ORDERS
    from Orders
    group by Customer_ID)B
where NO_OF_ORDERS>(
    select AVG(COUNT_ORDERS) as AVERAGE_NO_OF_ORDERS
    from(
        select Customer_ID, COUNT(distinct Order_ID) as COUNT_ORDERS
        from Orders
        group by Customer_ID) A)
```

	Customer_ID	NO_OF_ORDERS
1	AA-10375	9
2	AB-10060	8
3	AB-10105	10
4	AB-10165	8
5	AB-10255	9
6	AC-10450	7
7	AD-10180	8
8	AF-10870	7
9	AG-10495	8
10	AG-10675	7
11	AG-10900	10
12	AH-10030	7
13	AH-10075	10
14	AH-10120	7
15	AH-10210	9

35- write a query to print product id and total sales of highest selling products (by no of units sold) in each category

```
select * from(
    select Category,Product_ID,SUM(Quantity) as TOTAL_QTY_SOLD
    from Orders
    group by Category,Product_ID) ABC
inner join(
    select category, MAX(total_quantity) AS max_quantity
    FROM (
        SELECT category, product_id, SUM(quantity) AS total_quantity
        FROM orders
        GROUP BY category, product_id
    ) XYZ
    GROUP BY category) DEF
on ABC.Category=DEF.Category
where abc.TOTAL_QTY_SOLD=DEF.max_quantity
```

	Category	Product_ID	TOTAL_QTY_SOLD	category	max_quantity
1	Technology	TEC-AC-10003832	75	Technology	75
2	Office Supplies	OFF-PA-10001970	70	Office Supplies	70
3	Furniture	FUR-CH-10002647	64	Furniture	64

36- Print top 5 selling products from each category by sales

```
select * from(
    select *, ROW_NUMBER() over(partition by category order by total_sales desc) as rn
    from (
        select Category,Product_ID, SUM(Sales) as total_sales
        from Orders
        group by Category,Product_ID) A) B
where rn<=5
```

	Category	Product_ID	total_sales	rn
1	Furniture	FUR-CH-10002024	21870.576	1
2	Furniture	FUR-BO-10004834	15610.9656	2
3	Furniture	FUR-TA-10003473	12995.2915	3
4	Furniture	FUR-CH-10001215	12975.382	4
5	Furniture	FUR-BO-10002213	12921.643	5
6	Office Supplies	OFF-BI-10003527	27453.384	1
7	Office Supplies	OFF-BI-10001359	19823.479	2
8	Office Supplies	OFF-BI-10000545	19024.5	3
9	Office Supplies	OFF-BI-10004995	17965.068	4
10	Office Supplies	OFF-SU-10000151	17030.312	5
11	Technology	TEC-CO-10004722	61599.824	1
12	Technology	TEC-MA-10002412	22638.48	2
13	Technology	TEC-CO-10001449	18839.686	3
14	Technology	TEC-MA-10001127	18374.895	4
15	Technology	TEC-MA-10000822	16829.901	5

37- write a query to find top 3 and bottom 3 products by sales in each region. (24 rows)

```
select *,CASE
    WHEN top3 <= 3 THEN 'Top 3'
    ELSE 'Bottom 3'
    END AS top_bottom from(
    select *, ROW_NUMBER() over(partition by region order by
    total_sales desc) as top3
    , ROW_NUMBER() over(partition by region order by total_sales )
    as bottom3
    from (
        select region,Product_ID, SUM(Sales) as total_sales
        from Orders
        group by Product_ID,Region) A)B
    where top3<4 or bottom3<4
```

	region	Product_ID	total_sales	top3	bottom3	top_bottom
1	Central	OFF-AP-10002906	0.444	1310	1	Bottom 3
2	Central	OFF-BI-10003727	0.836	1309	2	Bottom 3
3	Central	OFF-BI-10000494	1.044	1308	3	Bottom 3
4	Central	OFF-BI-10001120	11339.94	3	1308	Top 3
5	Central	TEC-MA-10000822	14279.916	2	1309	Top 3
6	Central	TEC-CO-10004722	17499.95	1	1310	Top 3
7	East	OFF-FA-10000490	1.24	1422	1	Bottom 3
8	East	OFF-AR-10001118	2.696	1421	2	Bottom 3
9	East	OFF-AR-10000369	2.78	1420	3	Bottom 3
10	East	FUR-BO-10004834	11717.034	3	1420	Top 3
11	East	TEC-MA-10001047	14299.89	2	1421	Top 3
12	East	TEC-CO-10004722	30099.914	1	1422	Top 3
13	South	OFF-AR-10001868	1.344	1057	1	Bottom 3
14	South	TEC-AC-10003709	1.584	1056	2	Bottom 3
15	South	OFF-AR-10003087	1.78	1055	3	Bottom 3

38- Among all the sub categories. Which sub category had highest month over month growth by sales in Jan 2020.

```
SELECT TOP 1 *,
    100 * (TOTAL_SALES - PREV_MONTH_SALE) / PREV_MONTH_SALE AS
MONTH_BYMONTH_GROWTH
FROM (
    SELECT *,
        LAG(TOTAL_SALES) OVER (PARTITION BY Sub_Category ORDER BY
year_month) AS PREV_MONTH_SALE
    FROM (
        SELECT Sub_Category,
            SUM(Sales) AS TOTAL_SALES,
            FORMAT(order_date, 'yyyyMM') AS year_month
        FROM Orders
        GROUP BY Sub_Category, FORMAT(order_date, 'yyyyMM')
    ) AS A
) AS B
WHERE year_month = '202001'
ORDER BY MONTH_BYMONTH_GROWTH;
```

	Sub_Category	TOTAL_SALES	year_month	PREV_MONTH_SALE	MONTH_BYMONTH_GROWTH
1	Appliances	64.864	202001	2148.398	-96.9808201273693
2	Fasteners	7.56	202001	94.052	-91.9618934206609
3	Copiers	959.968	202001	7899.854	-87.8482817530552
4	Chairs	1602.224	202001	10276.985	-84.4095909452043
5	Art	153.706	202001	912.046	-83.1471219653395
6	Accessories	2025.738	202001	11918.92	-83.004013786484
7	Paper	596.176	202001	2966.89	-79.9056924928123
8	Envelopes	217.58	202001	918.352	-76.307559628552
9	Phones	2634.36	202001	9901.842	-73.3952531256306
10	Labels	91.06	202001	341.786	-73.3575980291762
11	Tables	2714.469	202001	7625.99	-64.4050280684868
12	Binders	1756.296	202001	4812.206	-63.5033080462474
13	Furnishings	1066.514	202001	2530.602	-57.85532454333
14	Storage	2412.44	202001	3969.936	-39.2322697393611
15	Bookcases	2239.536	202001	2652.2422	-15.5606527940774

39- write a query to print top 3 products in each category by year over year sales growth in year 2020.

```

SELECT * FROM (
    SELECT *, RANK() OVER (PARTITION BY category ORDER BY (sales - prev_year_sales) /
prev_year_sales DESC) AS rn
    FROM (
        SELECT *, LAG(sales) OVER (PARTITION BY category, product_id ORDER BY
order_year) AS prev_year_sales
        FROM (
            SELECT category, product_id, DATEPART(YEAR, order_date) AS order_year,
SUM(sales) AS sales
            FROM orders
            GROUP BY category, product_id, DATEPART(YEAR, order_date)
        ) AS cat_sales
    ) AS prev_year_data
    WHERE order_year = 2020
) AS rnk
WHERE rn <= 3;

```

	category	product_id	order_year	sales	prev_year_sales	rn
1	Furniture	FUR-TA-10001095	2020	5176.413	244.006	1
2	Furniture	FUR-FU-10004864	2020	1303.002	76.728	2
3	Furniture	FUR-FU-10001037	2020	100.488	7.584	3
4	Office Supplies	OFF-BI-10001721	2020	286.492	8.552	1
5	Office Supplies	OFF-BI-10004781	2020	203.136	9.522	2
6	Office Supplies	OFF-LA-10003720	2020	73.8	3.69	3
7	Technology	TEC-PH-10002555	2020	1812.65	155.37	1
8	Technology	TEC-AC-10003832	2020	5970.5	617.976	2
9	Technology	TEC-PH-10003171	2020	359.6	44.95	3

40- write a sql to find top 3 products in each category by highest rolling 3 months total sales for Jan 2020.

```
SELECT *
FROM (
    SELECT *, RANK() OVER(PARTITION BY category ORDER BY roll3_sales DESC) AS
rn
    FROM (
        SELECT *,SUM(sales) OVER (PARTITION BY category, product_id ORDER BY
yo, mo ROWS BETWEEN 2 PRECEDING AND CURRENT ROW ) AS roll3_sales
        FROM (
            SELECT category, product_id, DATEPART(YEAR, order_date) AS yo,
DATEPART(MONTH, order_date) AS mo,SUM(sales) AS sales
            FROM orders
            GROUP BY category, product_id, DATEPART(YEAR, order_date),
DATEPART(MONTH, order_date)
            ) AS xxx
            ) AS yyyy
        WHERE yo = 2020 AND mo = 1
    ) AS A
WHERE rn <= 3;
```

	Category	Product_ID	YO	MO	TOTAL_SALES	ROLLING_SUM	rn
1	Furniture	FUR-BO-10002545	2020	1	1565.88	2724.6312	1
2	Furniture	FUR-TA-10000617	2020	1	1592.85	2423.4075	2
3	Furniture	FUR-TA-10002903	2020	1	181.797	2311.419	3
4	Office Supplies	OFF-BI-10003527	2020	1	1270.99	8134.336	1
5	Office Supplies	OFF-ST-10001526	2020	1	1564.29	2262.204	2
6	Office Supplies	OFF-ST-10004337	2020	1	428.68	857.36	3
7	Technology	TEC-AC-10002049	2020	1	371.97	4879.05	1
8	Technology	TEC-PH-10004241	2020	1	1439.968	1439.968	2
9	Technology	TEC-CO-10000971	2020	1	959.968	1439.952	3

41- write a query to find products for which month over month sales has never declined.(272 record)

```
select distinct Product_ID from(
    select *,LAG(sales, 1, 0) over(partition by product_id order by yo,mo) as LAG_SALES
    from(
        select Product_ID, YEAR(Order_Date) as YO, MONTH(Order_Date) as MO, sum(sales) as sales
        from Orders
        group by product_id ,YEAR(Order_Date),MONTH(Order_Date))A)B
    where Product_ID not in (select Product_ID from(
        select *,LAG(sales, 1, 0)
        over(partition by product_id order by yo,mo) as LAG_SALES
        from(
            select Product_ID,YEAR(Order_Date) as YO
            ,MONTH(Order_Date) as MO
            ,sum(sales) as sales
            from Orders
            group by product_id ,YEAR(Order_Date),MONTH(Order_Date))A)B
        where sales<LAG_SALES
        group by Product_ID )
```

	Product_ID
1	FUR-BO-10000112
2	FUR-BO-10000711
3	FUR-BO-10001567
4	FUR-BO-10002202
5	FUR-BO-10002206
6	FUR-BO-10003404
7	FUR-BO-10003433
8	FUR-BO-10003450
9	FUR-BO-10003893
10	FUR-BO-10004360
11	FUR-BO-10004690
12	FUR-CH-10002017
13	FUR-CH-10002044
14	FUR-CH-10002317
15	FUR-CH-10002758

42- write a query to find month wise sales for each category for months where sales is more than the combined sales of previous 2 months for that category. (21 rows)

```
select * from (
    select *,SUM(TOTAL_SALES) over(partition by category order by yo,mo
    rows between 2 preceding and 1 preceding) as MONTH2_SALES
    from(
        select Category, YEAR(Order_Date) as YO, MONTH(Order_Date) as MO
        , SUM(Sales) as TOTAL_SALES
        from Orders
        group by Category,MONTH(Order_Date),YEAR(Order_Date)) A) B
    where TOTAL_SALES>MONTH2_SALES
```

	category	yo	mo	sales	prev2_sales
1	Furniture	2018	3	14573.956	8082.183
2	Furniture	2018	9	23816.4808	18141.3975
3	Furniture	2019	9	26273.023	23313.0122
4	Furniture	2020	3	12801.092	11548.294
5	Furniture	2020	9	27262.8809	25551.7513
6	Furniture	2021	9	29028.206	27254.896
7	Office Supplies	2018	3	8605.879	5922.804
8	Office Supplies	2018	4	11155.074	9677.603
9	Office Supplies	2018	9	27423.298	26500.67
10	Office Supplies	2019	3	15882.547	7176.847
11	Office Supplies	2019	9	19305.767	16455.047
12	Office Supplies	2020	3	17346.931	12094.032
13	Office Supplies	2020	9	23263.738	21884.184
14	Office Supplies	2020	12	37997.566	36769.072
15	Office Supplies	2021	8	30059.852	27153.507