The dataset comprised three key entities — Customers, Products, and Sales — forming a star schema structure.

The specific goals were to:

1. Evaluate business performance by calculating total revenue, profit, and growth trends.

2. Identify high-value customers (CLV) and understand customer purchasing behavior through RFM (Recency, Frequency, Monetary) segmentation.

3. Measure product and category profitability to determine which drives the most value.

4. Analyze regional and sales representative performance to identify the areas of strength and opportunity.

5. Detect customer churn and uncover retention opportunities.

Queries:

```
-- Total Sales transactions
    select count(*)
    from sales;

-- List Unique product categories
    select distinct category
    from products;

-- Total revenue from all sales
    select sum(s.quantity * p.unitprice) as Total_revenue
    from sales as s
    join products as p
    on s.ProductID = p.ProductID;

-- Revenue, Profit & Gross Margin Percentage
    select sum(s.quantity * p.unitprice) as Total_revenue,
            round(sum(quantity*(unitprice - unitcost)),0) as Profit,
       round((sum(quantity*(unitprice - unitcost))/ sum(s.quantity * p.unitprice))*100,2) as
    Gross_margin_percent
    from sales as s
    join products as p
    on s.ProductID = p.ProductID;

-- Top 3 Product categories by revenue
    select Category, sum(s.quantity * p.unitprice) as Total_revenue
    from sales as s
    join products as p
    on s.ProductID = p.ProductID
    group by category
```

```
order by 2 desc
limit 3;
```

-- Sales done by sales rep

```
select SalesRep,sum(Quantity) as Total_units, sum(s.quantity * p.unitprice) as Total_revenue
from sales as s
join products as p
on s.ProductID = p.ProductID
group by 1
order by 3 desc;
```

-- Top 5 customers by revenue

```
select customername, sum(s.quantity * p.unitprice) as Total_revenue
from sales as s
join products as p
on s.ProductID = p.ProductID
join customers as c
on s.CustomerID = c.CustomerID
group by 1
order by 2 desc
limit 5;
```

-- Revenue by region

```
select region, sum(s.quantity * p.unitprice) as Total_revenue
from sales as s
join products as p
on s.ProductID = p.ProductID
join customers as c
on s.CustomerID = c.CustomerID
group by 1
order by 2 desc;
```

-- Profit per Product

```
select productname, round(sum(quantity*(unitprice - unitcost)),2) as Profit
from sales as s
join products as p
on s.ProductID = p.ProductID
group by 1
order by 2 desc;
```

-- Average order value by customer

```
select c.CustomerId, CustomerName, round(sum(s.quantity * p.unitprice)/count(distinct
saleid),2) as avg_order_value
from sales as s
join products as p
on s.ProductID = p.ProductID
join customers as c
on s.CustomerID = c.CustomerID
```

```
group by 1,2
order by 3 desc;
```

-- Monthly sales trend

```
select year(SaleDate) as `Year`, month(SaleDate) as `Month`, sum(s.quantity * p.unitprice) as
Total_revenue
from sales as s
join products as p
on s.ProductID = p.ProductID
group by 1,2
order by 1,2;
```

-- Top 10 High-value Customers by CLV

```
select
        c.CustomerId, CustomerName,
        sum(s.quantity * p.unitprice) as CLV,
        count(distinct s.saleid) as total_orders,
   max(cast(s.saledate as date)) as last_order_date,
   min(cast(s.saledate as date)) as first_order_date,
   round(avg(s.quantity * p.unitprice),2)as Avg_order_value
from sales as s
join products as p
on s.ProductID = p.ProductID
join customers as c
on s.CustomerID = c.CustomerID
group by 1,2
order by 3 desc
limit 10;
```

-- Top 10 products by profit margin percent

```
select ProductName,
        round((sum(quantity*(unitprice - unitcost))/ sum(s.quantity * p.unitprice))*100,2) as
        Profit_margin_percent
from sales as s
join products as p
on s.ProductID = p.ProductID
group by 1
order by 2 desc
limit 10;
```

-- Running total revenue per year

```
select year(saleDate) as `Year`, sum(s.quantity * p.unitprice) as Revenue,
sum(sum(s.quantity * p.unitprice)) over(order by year(saleDate)) as Running_total
from sales as s
join products as p
```

```
on s.ProductID = p.ProductID
group by 1
order by 1;

-- Category contribution % to total revenue
select Category,
        round(sum(s.quantity * p.unitprice)*100/
       (select sum(s1.quantity * p1.unitprice)from sales as s1 join products as p1 on
s1.ProductID = p1.ProductID),2)
  as Revenue_percent
from sales as s
join products as p
on s.ProductID = p.ProductID
group by 1
order by 2 desc;

-- Customers with no purchases in last 1 year
select distinct c.CustomerId, CustomerName
from customers as c
left join sales as s
on c.CustomerId =s.CustomerId
where c.CustomerId not in(
        select CustomerId
  from sales
  where SaleDate >= current_date - interval 1 year
);

-- Year-over-year(YoY) revenue growth
select year(SaleDate) as `Year`, sum(s.quantity * p.unitprice) as Revenue,
        lag(sum(s.quantity * p.unitprice)) over(order by year(SaleDate)) as
        Prev_year_revenue,
  round((sum(s.quantity * p.unitprice) - lag(sum(s.quantity * p.unitprice)) over(order by
year(SaleDate)))*100/
  nullif(lag(sum(s.quantity * p.unitprice)) over(order by year(SaleDate)),0),2) as
YoY_growth_percent
from sales as s
join products as p
on s.ProductID = p.ProductID
group by 1;

-- Customers with declining YoY revenue
with cte_revenue as(
        select c.CustomerId, CustomerName, year(SaleDate) as `Year`, sum(s.quantity *
        p.unitprice) as Revenue
  from sales as s
        join products as p
        on s.ProductID = p.ProductID
        join customers as c
```

```
        on s.CustomerID = c.CustomerID
    group by 1,2,3
),
cte_prev as(
        select CustomerId, CustomerName, Revenue,`Year`, lag(Revenue) over(partition by
        customerid order by `year`) as prev_revenue
    from cte_revenue
)
select CustomerId, CustomerName, `Year`, Revenue as actual_revenue, prev_revenue,
(Revenue-prev_revenue) as YoY_change
from cte_prev
where Revenue < prev_revenue and prev_revenue is not null
group by 1,2,3
order by 2, 4;
```

-- Repeat vs new customers

```
with cte_first as(
        select CustomerId, min(SaleDate) as first_order
    from sales as s
    group by 1
)
select month(SaleDate) as `Month`,
            count(distinct case when month(first_order) = month(SaleDate) then
            s.CustomerId end) as New_Customer,
            count(distinct case when month(first_order) < month(SaleDate) then
            s.CustomerId end) as Repeat_Customer
from sales as s
join cte_first as c
on s.CustomerId = c.CustomerId
group by 1
order by 1;
```

-- Top Sales rep each year

```
with cte_sales_rep as (
        select year(SaleDate) as `Year`, SalesRep,  sum(s.quantity * p.unitprice) as Revenue,
            rank() over(partition by year(SaleDate) order by sum(s.quantity * p.unitprice)
            desc) as ranks
        from sales as s
        join products as p
        on s.ProductID = p.ProductID
    group by 1,2
)
select `Year`, SalesRep, Revenue
from cte_sales_rep as c
where ranks = 1;
```

Insights:

Overall Performance	Calculated total revenue, profit, and margin from all transactions.	**Revenue:** 31.27M **Profit:** 10.36M **Gross Margin:** 33.14%
Regional Revenue	Summed revenue grouped by region to identify top-performing areas.	**Top Region:** West(≈ 9.05M, 29% of total revenue)
Top Customers (CLV)	Aggregated total spend per customer to find high-value clients.	**Top Customer:** Gabrielle Mullen – 137K lifetime value
Product Profitability	Calculated total and average profit per product/category.	**Top Category:** Electronics – 3.2M profit, 32.24% margin
Sales Growth Trend	Used window functions to compute YoY revenue growth.	**YoY Growth:** +12.6% (last year)
Customer Segmentation (RFM)	Computed Recency, Frequency, and Monetary scores for segmentation.	20% of customers generated 65% of revenue
Sales Rep Performance	Ranked sales reps by total revenue contribution.	**Top Rep:** Nicole Winters – 1.26M revenue
Churn Identification	Identified customers with no purchases in the past 12 months.	**Churn Rate:** 18.4%

Business Insights

- The West region and Electronics category are **key revenue drivers**.
- Top 10% customers contribute **over 50% of total profit**.
- Need to re-engage inactive customers to reduce churn.
- Analysis shows **steady YoY growth (~12%)**, signaling healthy momentum.