🛒 *E-Commerce Sales & Revenue Analysis*

(SQL | MySQL)

📌 Project Overview

This project analyzes **e-commerce sales transactions** using SQL to uncover insights related to **revenue performance, customer purchasing behavior, product effectiveness, order fulfillment, and revenue leakage**.

The analysis simulates a real-world online retail environment where customer behavior, product demand, and operational efficiency directly influence business performance. The project demonstrates how SQL can be used beyond querying data—to support **strategic business decisions** around growth, retention, and operations.

🎯 Business Objectives

★ Measure overall revenue and sales performance
★ Understand customer buying behavior (one-time vs repeat buyers)
★ Identify top-performing and underperforming products
★ Analyze order fulfillment health and cancellations
★ Quantify revenue leakage due to incomplete orders
★ Provide actionable recommendations for revenue growth

📑 Dataset Description

The project uses four relational tables:

👤 Customers Table

Column	Description
customer_id	Unique customer identifier
first_name	Customer first name
last_name	Customer last name
signup_date	Customer onboarding date
gender	Customer gender
region	Geographic region

📦 Orders Table

Column	Description
order_id	Unique order identifier
customer_id	Linked customer
order_date	Order placement date
order_status	Order lifecycle status
payment_mode	Payment method
order_amount	Total order revenue

🧾 Order Items Table

Column	Description
order_id	Linked order
product_id	Product identifier
quantity	Units purchased
price	Item price

🏷️ Products Table

Column	Description
product_id	Product identifier
product_name	Product name
category	Product category

🔍 Analysis Workflow

🧭 Step 1: Data Understanding & Sanity Checks

❖ Validated table relationships
❖ Verified date ranges and data coverage
❖ Ensured revenue consistency across orders

💰 Step 2: Revenue & Sales Trend Analysis

Key Questions:
❖ How much total revenue is generated?
❖ How many orders actually generate revenue?
❖ Are there seasonal revenue patterns?

Key Insights:
❖ Total revenue ≈ **₹407K**
❖ **561 out of 1000 orders** generate revenue
❖ Average spend ≈ **₹1,190 per order**
❖ Revenue shows **seasonal trends**
❖ ~₹97K revenue lost due to cancellations
❖ Significant revenue stuck in *Processing* orders

👫 Step 3: Customer Purchase Behavior

Key Questions:
❖ How many customers actually make purchases?
❖ Are customers repeat buyers or one-time buyers?

Key Insights:
❖ **641 out of 1000 customers** made purchases

❖ **316 One-Time Buyers**, **108 Repeat Buyers**
❖ Avg orders per customer: **1.32**
❖ One-time buyers contribute more total revenue
❖ Avg revenue per customer ≈ **₹1,400**

📦 Step 4: Product & Category Performance

Key Questions:
❖ Which products drive the most revenue?
❖ Which categories perform best and worst?

Key Insights:
❖ Top revenue products: *Headphones, Children's Books, Loafers, Lipsticks*
❖ Best categories: *Electronics, Apparels, Beauty, Books*
❖ High-volume products differ from high-value products
❖ Identified worst-performing products for inventory review

🚚📉 Step 5: Order Funnel & Fulfillment Analysis

Key Questions:
❖ How healthy is the order fulfillment pipeline?
❖ Are cancellations increasing?

Key Insights:
❖ **482 Completed**, **229 Processing**, **136 Cancelled** orders
❖ Completion rate ≈ **48%**
❖ Cancellation rate ≈ **14%**
❖ Cancellations increasing year-over-year
❖ Revenue loss due to cancellation ≈ **₹97K**

📊 Step 6: Advanced Business Insights

❖ Small % of customers drive large % of revenue
❖ Top-selling products are also top revenue contributors
❖ Revenue leakage is measurable and preventable
❖ Faster order completion can unlock trapped revenue

📊 Key Findings

★ Strong first-time customer value, weak retention
★ Revenue leakage through cancellations and delays
★ Product performance varies by volume vs value
★ Fulfillment efficiency directly impacts revenue realization
★ High-value customers exist but need prioritization

💼 Business Recommendations

🎯 Customer Retention Strategy
❖ Convert one-time buyers into repeat customers via post-purchase offers

🚚 Operational Improvements
❖ Reduce processing delays and pending orders
❖ Improve checkout and payment completion flow

📦 Product & Inventory Optimization
❖ Promote high-margin, low-volume products
❖ Bundle slow-moving items with best sellers

💰 Revenue Protection
❖ Proactively intervene on high-risk orders
❖ Reduce cancellation-driven revenue loss

🛠️ SQL Concepts Used

★ Joins (INNER JOIN)
★ Aggregations (SUM, AVG, COUNT)
★ CASE WHEN logic
★ Grouping & segmentation
★ Funnel analysis
★ Revenue and KPI derivation

📈 Project Skills Demonstrated

★ Business problem-solving using SQL
★ Revenue and sales analytics
★ Customer behavior analysis
★ Product performance evaluation
★ Translating data into executive insights

🧾 Tools Used

★ MySQL Workbench
★ SQL
★ Relational Database Design

👦🏻 Author

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