AI-Assisted Data Analysis Task

Pizza Sales Dataset | Exploratory Data Analysis

OBJECTIVE

Learn how AI can assist a data analyst during exploratory data analysis (EDA). Use AI to generate initial observations, ideas, patterns and hypotheses, then use **Python** and data analysis techniques to verify them, discover additional insights, and decide whether the AI's conclusions are supported by the data.

Your final analysis should show that you can combine AI assistance with analytical thinking and evidence-based decision making.

THE DATASET

Pizza orders, including **order dates and times**, **pizza categories**, **sizes**, **quantities**, **unit prices** and **sales**.

1	2	3	4	5	6	7
AI Exploration	Validate in Python	EDA	Visualization	AI Validation	New Insights	Conclusions

PART 1

AI Exploration

Before writing any Python code, use an AI assistant to explore the dataset. Ask the AI to help you identify:

Dataset Description

- What does the dataset represent?
- What does each feature describe?
- What business problem could this dataset help solve?

Initial Insights

- Possible trends
- Patterns
- Relationships
- Interesting observations
- Business opportunities

Goal Setting

Based on the AI's suggestions, use the AI to help you define a clear business objective and identify what you should investigate or adjust in the dataset.

PART 2

Validate the AI Using Python

Use the following libraries:

Python	NumPy	Pandas	Matplotlib	Seaborn

Your notebook should include the following sections:

1 Dataset Overview

- Import the required libraries
- Load the dataset
- Display the first few rows
- Display dataset information
- Describe the available features

2 Data Inspection

- Data types
- Missing values
- Duplicate records
- Descriptive statistics
- Unique values
- Potential outliers
- *Explain any issues you discover.*

3 Data Cleaning

- Handling missing values
- Removing duplicates
- Correcting inconsistent values
- Converting data types
- Creating additional date and time features if needed
- *Document every preprocessing step.*

PART 3

Exploratory Data Analysis

Use Python to investigate the questions suggested by the AI. You are encouraged to perform additional analyses beyond the AI's suggestions.

PART 4

Data Visualization

Use Matplotlib and Seaborn to create meaningful visualizations. Each visualization should include:

- A descriptive title
- Proper axis labels
- A short explanation of the insight obtained

PART 5

AI Validation

Compare your Python analysis with the AI's initial observations. For each major insight, answer:

Was the AI correct?	Partially correct?	Incorrect?

- What evidence from the data supports your conclusion?
- Discuss any assumptions made by the AI that were not supported by the dataset.

PART 6

New Insights

Identify insights that were **not suggested by the AI** but were discovered during your own analysis. Explain why these findings are valuable for the business.

PART 7

Conclusions

Summarize your work by answering the following:

- What were the most important business insights?
- Which AI-generated observations were confirmed?
- Which AI-generated observations were rejected?
- What new insights did you discover?
- What recommendations would you provide to management?
- What additional analyses could be performed in the future?

DELIVERABLES

1. Jupyter Notebook (.ipynb)

- Python code using NumPy, Pandas, Matplotlib and Seaborn
- Data cleaning steps
- Exploratory Data Analysis (EDA)
- Data visualizations
- AI validation and comparison
- New insights discovered independently
- Final conclusions and business recommendations

2. AI Interaction Log

A record of your chat with the AI assistant, including:

- All prompts used during exploration and analysis
- All AI responses relevant to the assignment
- Any follow-up questions or refinements you made

IMPORTANT

Do not rely solely on AI. AI should be used as an analytical assistant, not as the final authority. Every important observation should be verified using Python and supported by evidence from the dataset.

Your goal is to demonstrate that you can:

- Use AI to accelerate exploratory analysis
- Think critically about AI-generated insights
- Validate AI findings using data
- Discover additional insights independently
- Communicate evidence-based business recommendations

A successful submission shows both effective use of AI and strong analytical reasoning supported by data.