

**Question 1 :** Define Power BI and What are the key components of the Power BI ecosystem? Briefly explain:

- Power BI Desktop
- Power BI Service
- Power BI Mobile
- Power BI Gateway

**Answer :** Power BI is a Business Intelligence (BI) tool developed by Microsoft.

It is used to analyze data and create interactive reports and dashboards for better decision-making.

### **Key Components of Power BI Ecosystem**

#### **1. Power BI Desktop**

- A free Windows application
- Used to **connect data, clean data, and create reports**

#### **2. Power BI Service**

- Cloud-based (online) platform
- Used to **publish, share, and manage reports and dashboards**

#### **3. Power BI Mobile**

- Mobile app for Android and iOS
- Used to **view reports and dashboards on mobile devices**

#### **4. Power BI Gateway**

- Connects **on-premises (local) data sources** to Power BI Service
- Allows data refresh from local servers to the cloud

**Question 2 :** Compare the following Power BI visuals:

- Pie Chart vs Donut Chart
- Bar Chart vs Column Chart

When would you prefer one over the other? Give one example for each pair.

**Answer : 1. Pie Chart vs Donut Chart**

### **Pie Chart**

- Shows part-to-whole relationship
- Best when there are few categories (2–5)
- Easy to understand

### **When to use:**

When you want to clearly show percentage share

### **Example:**

Market share of products (Product A 40%, B 35%, C 25%)

### **Donut Chart**

- Similar to pie chart but has a hole in the center
- Center space can show total value or label
- Looks more visually attractive

**When to use:**

When you want part-to-whole + total value

**Example:**

Sales contribution by region with total sales shown in center

## 2. Bar Chart vs Column Chart

**Bar Chart**

- Bars are horizontal
- Best when category names are long
- Easy to compare many categories

**When to use:**

When labels are long or many items exist

**Example:**

Sales by product names with long product titles

**Column Chart**

- Bars are vertical
- Best for time-based data
- Very common and easy to read

**When to use:**

When comparing values over time (months/years)

**Example:**

Monthly sales from Jan to Dec

**Question 3 :** Explain the significance of:

- Star schema vs Snowflake schema
- Primary key vs Foreign key in relationships (Power BI)

Why is cardinality important?

**Answer : 1. Star Schema vs Snowflake Schema****Star Schema**

- One fact table connected directly to dimension tables
- Simple design and faster performance
- Easy to understand and use in Power BI

**Preferred when:**

You want better performance and simple reporting

**Example:**

Sales Fact connected to Date, Product, Customer tables

**Snowflake Schema**

- Dimension tables are further normalized (split into sub-tables)
- More complex design
- Slightly slower performance

**Preferred when:**

Data is highly normalized and storage optimization is needed

**Example:**

Product → Category → Sub-Category in separate tables

## **2. Primary Key vs Foreign Key (in Power BI)**

**Primary Key**

- A column with unique values
- Identifies each row in a table
- Cannot have duplicates or blanks

**Example:**

CustomerID in Customer table

**Foreign Key**

- A column that links to the primary key of another table
- Can have repeated values

**Example:**

CustomerID in Sales table

## **Why is Cardinality Important?**

**Cardinality defines the relationship type between tables:**

- One-to-One (1:1)
- One-to-Many (1:\*)

- Many-to-Many (.)

**Importance:**

- Ensures correct data relationships
- Prevents wrong totals and calculations
- Improves report accuracy and performance in Microsoft Power BI

**Example:**

One Customer → Many Sales (1:\*)

If wrong cardinality is set, sales numbers may be incorrect.

**Question 4 :** Differentiate between:

- Calculated column vs Measure

Also, define Row context and Filter context with simple examples.

**Answer : Calculated Column vs Measure**

**Calculated Column**

- Calculated row by row
- Stored in the table (uses memory)
- Value is fixed once data is refreshed
- Used in rows, columns, filters, slicers

**Example:**

TotalPrice = Quantity \* UnitPrice

→ Calculated for each row in Sales table

## Measure

- Calculated on the fly
- Not stored in the table
- Changes based on filters and visuals
- Used mainly in values area

### Example:

Total Sales = SUM(Sales[TotalPrice])

→ Value changes by year, region, product, etc.

## Row Context vs Filter Context

### Row Context

- Calculation works one row at a time
- Mostly used in calculated columns

### Example:

In a Sales table,

Profit = Sales - Cost

→ Power BI calculates profit for each row separately

### Filter Context

- Calculation works on filtered data

- Created by slicers, filters, rows/columns in visuals
- Mostly affects measures

**Example:**

If Year = 2024 is selected,  
Total Sales shows only 2024 sales

**Question 5:** What is the difference between a report and a dashboard in Power BI?

**Answer : Report (Power BI Report)**

- Created in Power BI Desktop
- Can have multiple pages
- Uses data from one dataset
- Allows detailed analysis with filters and slicers
- More interactive

**Example:**

A sales report with separate pages for Monthly Sales, Product-wise Sales, and Region-wise Sales

**Dashboard (Power BI Dashboard)**

- Created in Power BI Service (online)
- Has only one page



- Can combine visuals from multiple reports/datasets
- Used for quick overview
- Less interactive than reports

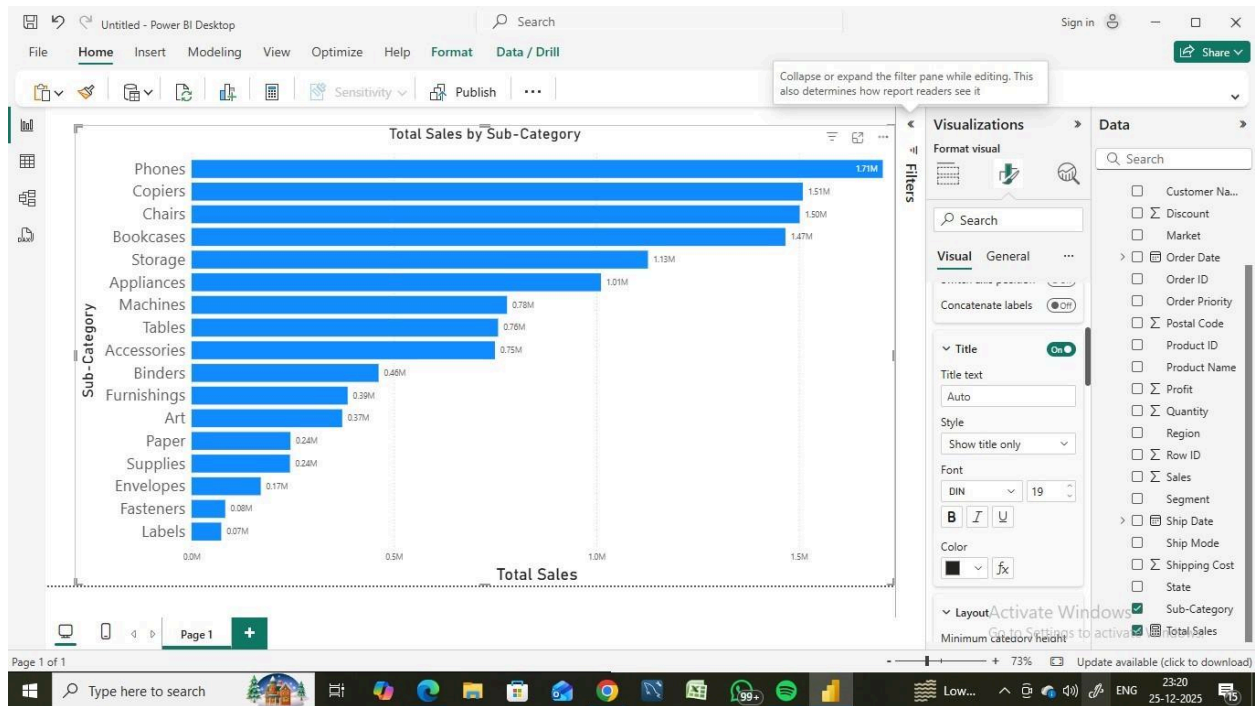
### Example:

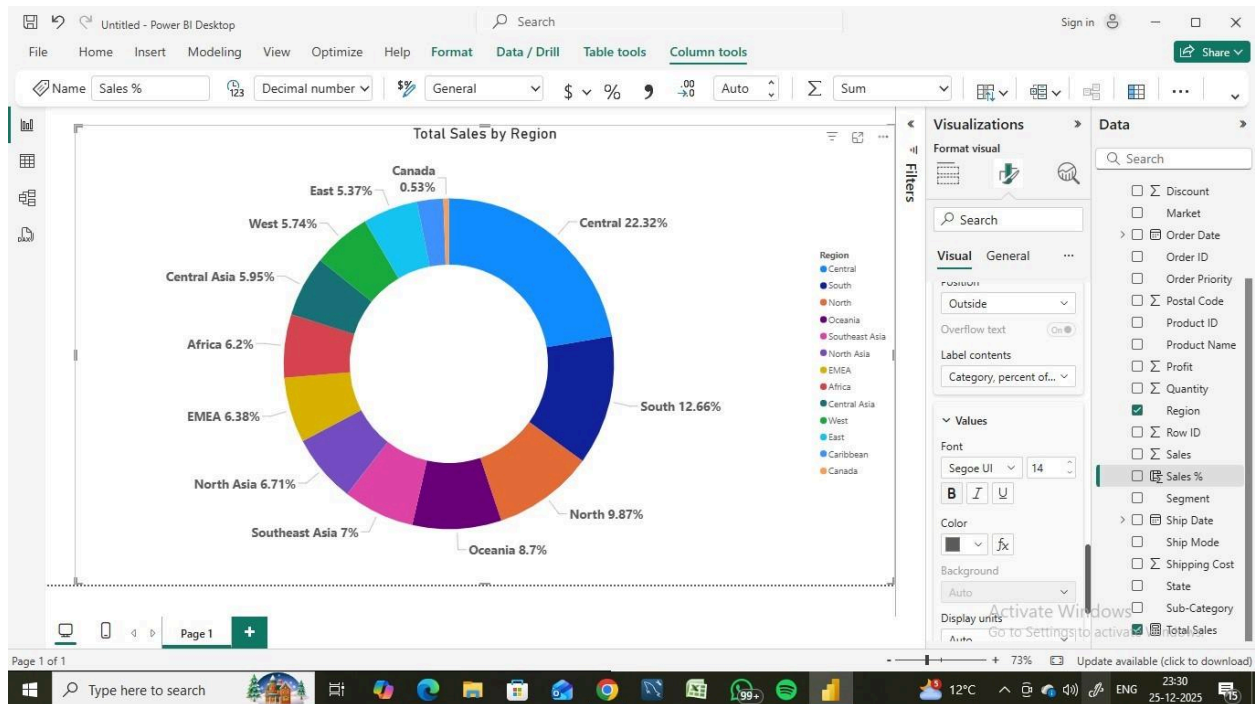
A one-page dashboard showing Total Sales, Profit, and Top Products at a glance

### Question 6 : Using the Sample Superstore dataset:

- Create a Clustered Bar Chart to display Total Sales by Sub-Category
- Create a Donut Chart for Sales % by Region

### Answer :





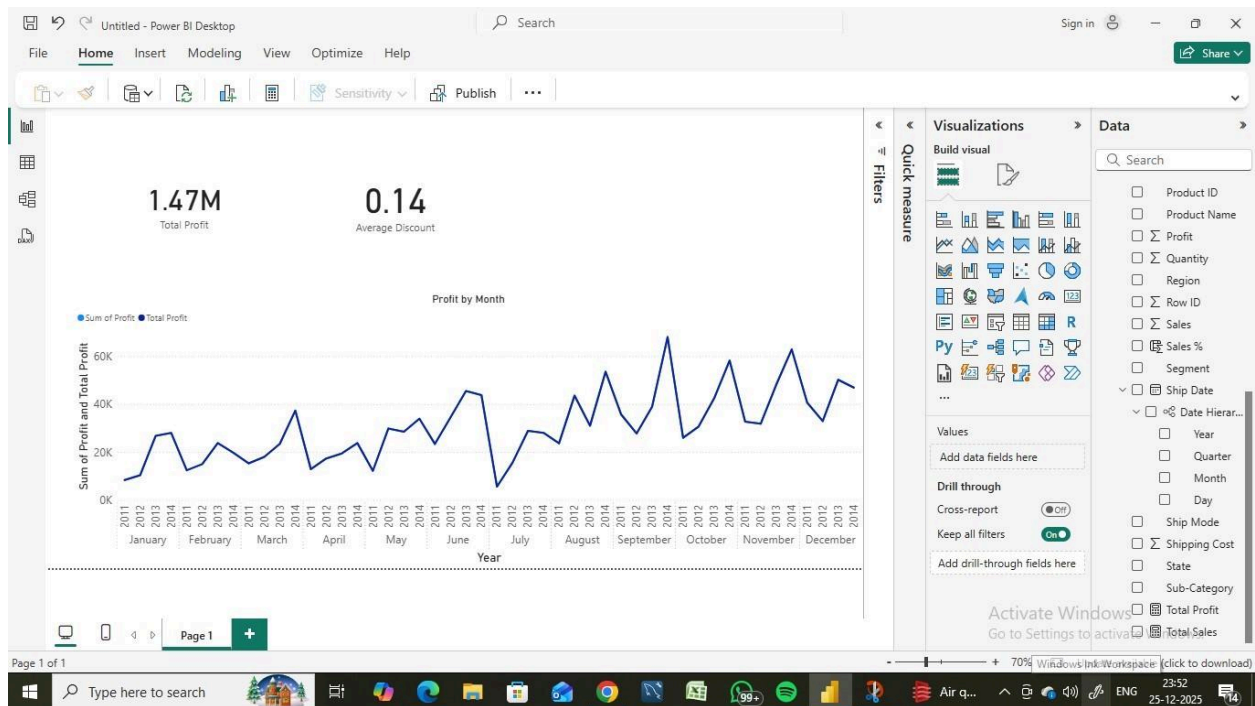
**Question 7 :** Write and apply the following measures:

- Total Profit =  $\text{SUM}([\text{Profit}])$
- Average Discount =  $\text{AVERAGE}([\text{Discount}])$

Display both in a KPI Card, and use a Line Chart to show profit trend over months.

Add visuals and DAX formulas.

## Answer:



**Question 8 :** Implement a DAX measure that calculates the percentage of total sales by product category.

Product Category	Sales Amount
Electronics	5000
Clothing	3000
Home Appliances	7000
Books	2000
Tables & Chairs	8000
Toy	1500

Sports Equipment 1200

Office Supplies 1000

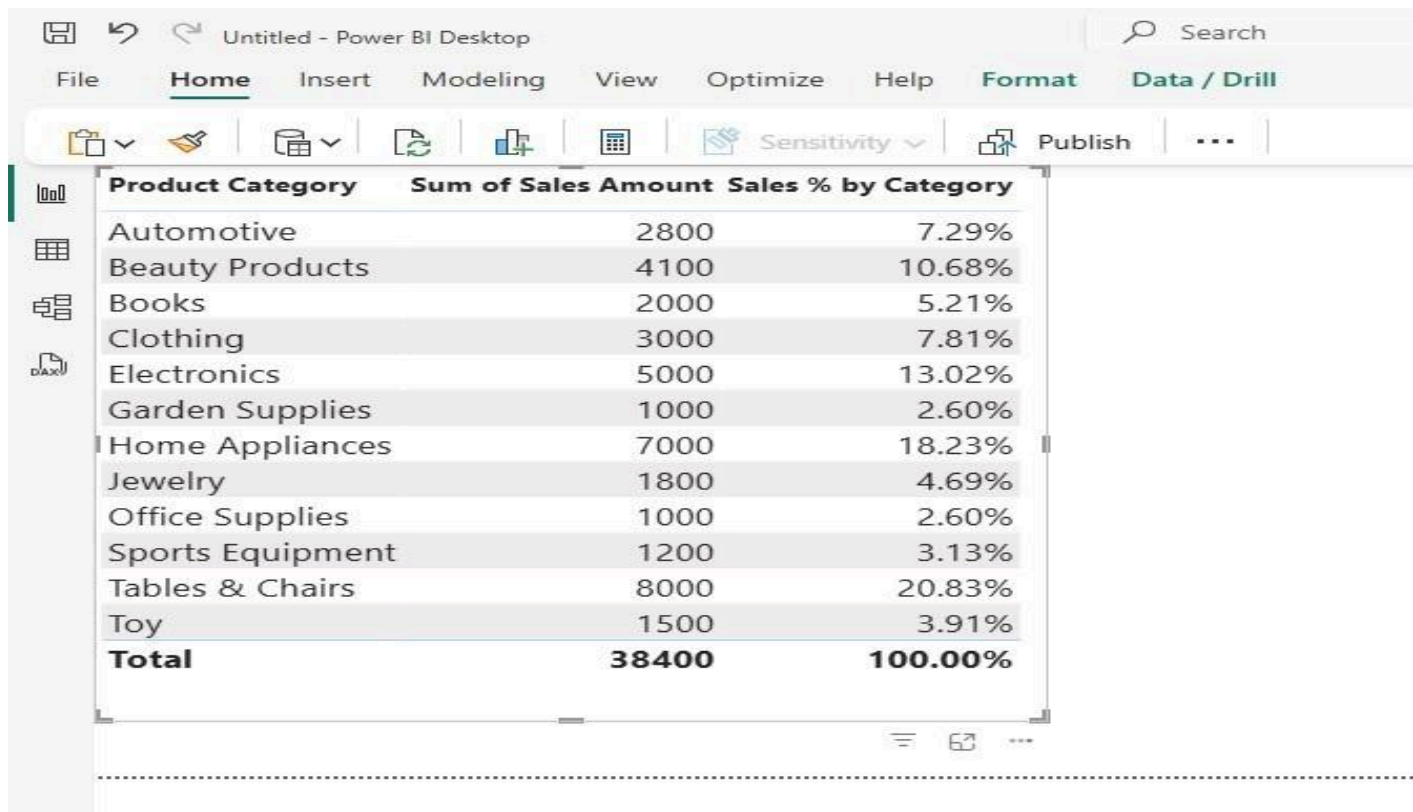
Beauty Products 4400

Garden Supplies 1000

Jewelry 1800

Automotive 2600

**Answer:**



The screenshot shows the Power BI Desktop interface with a table visual. The table has three columns: 'Product Category', 'Sum of Sales Amount', and 'Sales % by Category'. The data is sorted by 'Sum of Sales Amount' in descending order. The total sum of sales is 38400, and the total percentage is 100.00%.

Product Category	Sum of Sales Amount	Sales % by Category
Automotive	2800	7.29%
Beauty Products	4100	10.68%
Books	2000	5.21%
Clothing	3000	7.81%
Electronics	5000	13.02%
Garden Supplies	1000	2.60%
Home Appliances	7000	18.23%
Jewelry	1800	4.69%
Office Supplies	1000	2.60%
Sports Equipment	1200	3.13%
Tables & Chairs	8000	20.83%
Toy	1500	3.91%
<b>Total</b>	<b>38400</b>	<b>100.00%</b>