

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

Ans: Power BI is a business analytics tool developed by Microsoft that enables users to visualize data, share insights, and make informed decisions using interactive reports and dashboards.

Key Components of the Power BI Ecosystem:

- Power BI Desktop: A Windows application for creating reports and data models. It's used for data transformation, visualization, and building analytics.
- Power BI Service: An online SaaS (Software as a Service) platform where users publish, share, and collaborate on reports and dashboards.
- Power BI Mobile: A mobile app (iOS, Android, Windows) that lets users access and interact with reports and dashboards on the go.

Power BI Gateway: A bridge that connects on-premises data sources to Power BI Service, enabling scheduled refreshes and live data access.

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.

Ans: Power BI Visuals Comparison :

Pie Chart vs Donut Chart

- **Similarity:** Both show part-to-whole relationships using slices.

Difference: Donut Chart has a blank center (better for adding labels or totals).

When to prefer:

- **Pie Chart:** Use for simple part-to-whole comparisons with few categories.
Example: Showing sales share by product category.
 - **Donut Chart:** Prefer when you want to display total value in the center or need a cleaner look.
Example: Showing budget distribution with total in the middle.
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Bar Chart vs Column Chart

- **Similarity:** Both display data using rectangular bars.
- **Difference:**
 - **Bar Chart:** Horizontal bars
 - **Column Chart:** Vertical bars

When to prefer:

- **Bar Chart:** Better for long category names or many categories.
Example: Comparing revenue across different countries.
- **Column Chart:** Better for showing trends over time.
Example: Monthly sales performance.

Question 3 : Explain the significance of:

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

Why is cardinality important?

Ans: Power BI Data Modelling :

Star Schema vs Snowflake Schema

- **Star Schema:** Central fact table linked to denormalized dimension tables.
 - **Faster** and easier for reporting.
- **Snowflake Schema:** Fact table linked to normalized (split) dimension tables.

More complex, but saves storage.

Significance: Star schema is preferred in Power BI for better performance and simplicity.

Primary Key vs Foreign Key

- **Primary Key:** Unique identifier in a table (e.g., CustomerID in Customers table).
- **Foreign Key:** Field in one table that refers to the primary key in another (e.g., CustomerID in Sales table).

Significance: Keys create relationships between tables for accurate data analysis.

Why is Cardinality Important?

- **Cardinality** defines the relationship type:
 - **One-to-Many (1:*):** Common, preferred in Power BI.
 - **Many-to-Many (:):** Can cause ambiguity or performance issues.

Significance: Ensures correct data joins and accurate visuals.

Question 4 : Differentiate between:

● Calculated column vs Measure

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

Ans: Power BI DAX Concepts:

Calculated Column vs Measure

| Feature | Calculated Column | Measure |
|------------------|------------------------------|-------------------------------------|
| Definition | Adds a new column to a table | Calculates a value based on context |
| Stored in Model | Yes (takes up space) | No (calculated on the fly) |
| Uses Row Context | Yes | No (uses filter context) |

| Feature | Calculated Column | Measure |
|---------|---------------------------------------|---------------------------------|
| Example | FullName = FirstName & " " & LastName | TotalSales = SUM(Sales[Amount]) |

When to use:

- **Calculated Column:** When you need a new data field.
- **Measure:** When you need dynamic aggregation or calculations in visuals.

Row Context

- Applies to **each row** in a table (mainly in calculated columns or iterators).
- **Example:**
Sales[Total] = Sales[Quantity] * Sales[Price]
→ Calculated row by row.

Filter Context

- Comes from report filters, slicers, or visual context.

Example:

A measure like TotalSales = SUM(Sales[Amount])

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- → Changes based on selected year or region in a visual.

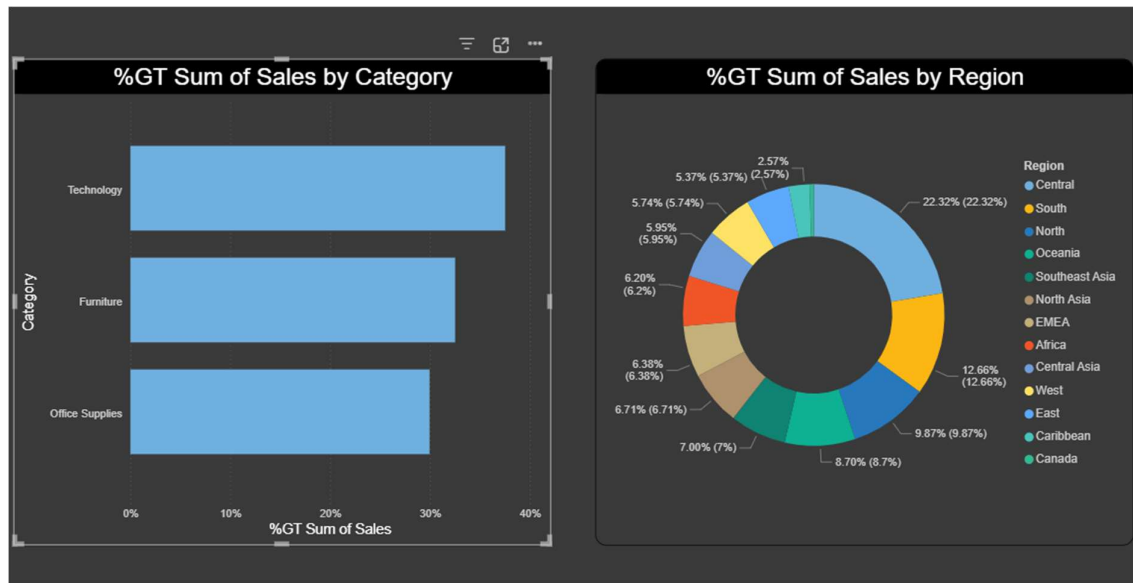
Question 5: What is the difference between a report and a dashboard in Power BI?

Ans: In Power BI, a **report** is a detailed, multi-page canvas that contains a variety of visuals (charts, tables, maps, etc.) built from a single dataset. Reports allow deep data analysis and support rich interactivity like slicers, drill-through, and filtering. They are usually created in Power BI Desktop and published to the Power BI Service.

On the other hand, a **dashboard** is a single-page summary that displays key insights using visual tiles, which can come from **multiple reports or datasets**. Dashboards are created only in the Power BI Service and are designed for quick, high-level overviews rather than in-depth analysis. While they offer limited interactivity, dashboards are ideal for monitoring key metrics at a glance.

Question 6 : Using the Sample Superstore dataset:

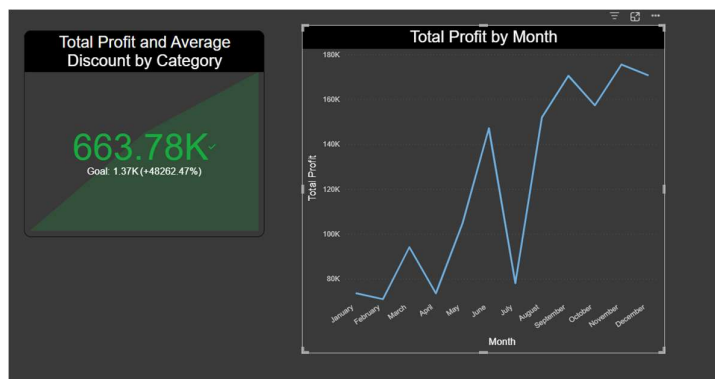
- Create a Clustered Bar Chart to display Total Sales by Sub-Category
 - Create a Donut Chart for Sales % by Region
- (Provide screenshots of both visuals.)



Question 7 : Write and apply the following measures:

- Total Profit = SUM([Profit])
- Average Discount = AVERAGE([Discount])

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



Average Discount = SUM(Global_Superstore2[Discount])

Total Profit = SUM(Global_Superstore2[Profit])

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 |

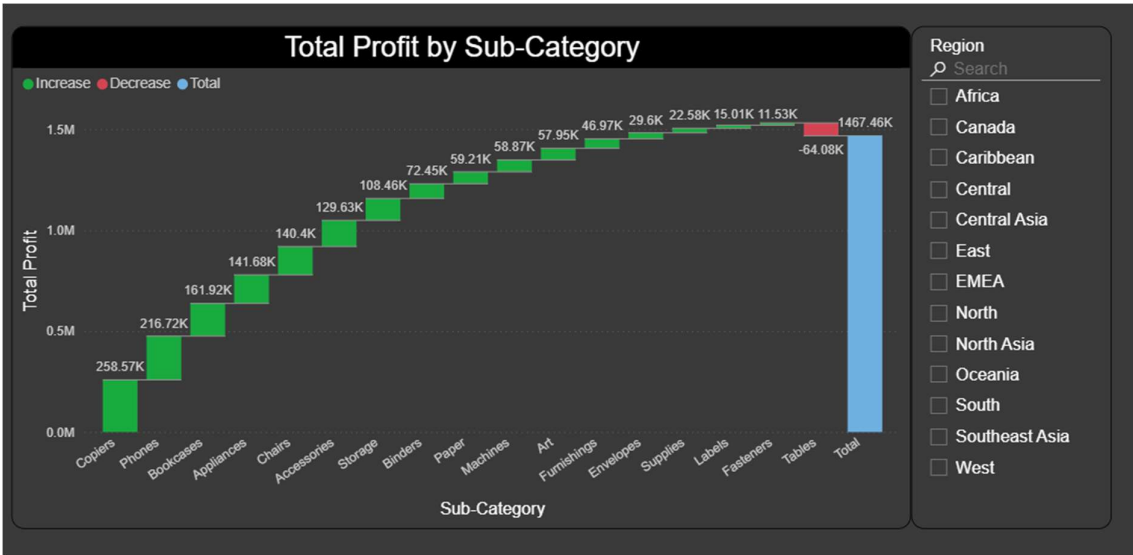
| Product_category | Sum of Sales_Amount | %GT % of Total Sales |
|------------------|---------------------|----------------------|
| Automotive | 2600 | 6.75% |
| Beauty Products | 4400 | 11.43% |
| Books | 2000 | 5.19% |
| Clothing | 3000 | 7.79% |
| Electronics | 5000 | 12.99% |
| Garden Supplies | 1000 | 2.60% |
| Home Appliances | 7000 | 18.18% |
| Jewelry | 1800 | 4.68% |
| Office Supplies | 1000 | 2.60% |
| Sports Equipment | 1200 | 3.12% |
| Tables & Chairs | 8000 | 20.78% |
| Toy | 1500 | 3.90% |
| Total | 38500 | 100.00% |

Question 9 :

- Create a DAX Measure for Total Profit
- Use it in a Waterfall Chart to analyze how different Sub-Categories contribute to overall profit
- Add a Slicer for Region to filter the visual
- Write brief business insights (4–5 lines) from the chart and provide 2–3 data-driven recommendations to improve profit.

Answer :

The Waterfall Chart shows total profit across sub-categories — *Copiers* and *Phones* drive the highest gains, while *Tables* reduce overall profit. Focusing on top-performing items and improving pricing or cost control in loss-making ones (like *Tables*) can boost profitability across regions.



Question 10 : Scenario:

VitaTrack Wellness, a digital health company in FitZone, has collected data on users' daily habits and health vitals. The analytics team is tasked with drawing actionable insights from this data to improve lifestyle suggestions and prevent heart-related risks.

Your Task: Using the provided dataset (includes Age, Gender, BMI, Steps, Calories, Sleep, Heart Rate, Blood Pressure, Smoking, Alcohol, Exercise, Diabetic & Heart Disease status): Build a one-page Power BI dashboard that answers:

1. Are users maintaining a balanced lifestyle (Steps, Sleep, Calories)
2. What lifestyle patterns (Smoking, Alcohol, BMI, etc.) indicate heart disease risk?
3. Is there any visible relationship between Sleep and Physical Activity?
4. How does BMI vary across Age Groups and Genders?
5. What is the impact of smoking and alcohol on heart rate and blood pressure?
6. Segment people based on their health activity to suggest lifestyle changes

