

**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, created by Microsoft, is a powerful data visualization and business analytics tool that helps users analyze information, generate insights, and support decision-making through interactive reports and dashboards.

**Core Elements of Power BI:**

- **Power BI Desktop:** A desktop tool used for building reports, transforming data, and developing visual models.
- **Power BI Service:** A cloud service (SaaS) that allows publishing, sharing, and collaborative use of dashboards and reports.
- **Power BI Mobile:** A mobile application that provides access to reports and dashboards on smartphones and tablets.
- **Power BI Gateway:** A connector that enables access to on-premises data from the Power BI Service with options for live connectivity and scheduled refresh.

**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 visualize parts of a whole using slices.
- **Difference:** The Donut Chart includes a hollow center, which can display totals or labels neatly.

**When to Use:**

- **Pie Chart:** Ideal for simple comparisons of categories contributing to a total.  
*Example:* Representing sales contribution by product type.
  - **Donut Chart:** Useful when you want to highlight the total value or add a modern, minimal look.  
*Example:* Visualizing overall budget allocation with the total shown in the center.
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### Bar Chart vs Column Chart

- **Similarity:** Both use rectangular bars to represent data values.
- **Difference:**
  - **Bar Chart:** Displays data horizontally.
  - **Column Chart:** Displays data vertically.

### When to Use:

- **Bar Chart:** Best for datasets with many or lengthy category names.  
*Example:* Comparing revenue among various countries.
- **Column Chart:** Suitable for showcasing trends or changes over time.  
*Example:* Tracking monthly sales results.

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

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

Why is cardinality important?

### Power BI Data Modelling

#### Star Schema vs Snowflake Schema

- **Star Schema:** Consists of a central fact table connected to denormalized dimension tables.  
*It is faster and easier to use for reporting and analysis.*

- **Snowflake Schema:** Contains a fact table linked to normalized dimension tables that are split into sub-tables.

*It is more complex but conserves storage space.*

**Significance:** Power BI generally prefers the **Star Schema** for its simplicity, better query performance, and ease of maintenance.

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### Primary Key vs Foreign Key

- **Primary Key:** A unique field that identifies each record in a table (e.g., CustomerID in the Customers table).
- **Foreign Key:** A field in one table that references the primary key of another table (e.g., CustomerID in the Sales table).

**Significance:** These keys help establish relationships between tables, ensuring data consistency and accurate reporting.

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### Importance of Cardinality

- **Cardinality** defines how data in one table relates to data in another.
  - **One-to-Many (1:\*):** Common and preferred in Power BI.
  - **Many-to-Many (:):** More complex and may lead to ambiguous relationships or slower performance.

**Significance:** Proper cardinality ensures accurate joins and reliable visualizations in dashboards.

**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                             |
|-------------------------|---------------------------------------|-------------------------------------|
| <b>Definition</b>       | Adds a new column to a table          | Calculates a value based on context |
| <b>Stored in Model</b>  | Yes (takes up space)                  | No (calculated on the fly)          |
| <b>Uses Row Context</b> | Yes                                   | No (uses filter context)            |
| <b>Example</b>          | 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.

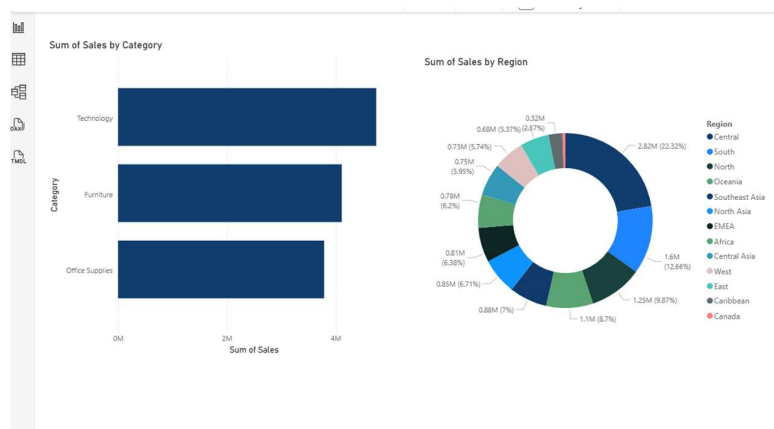
**Question 5:** What is the difference between a report and a dashboard in Power BI?

**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. )



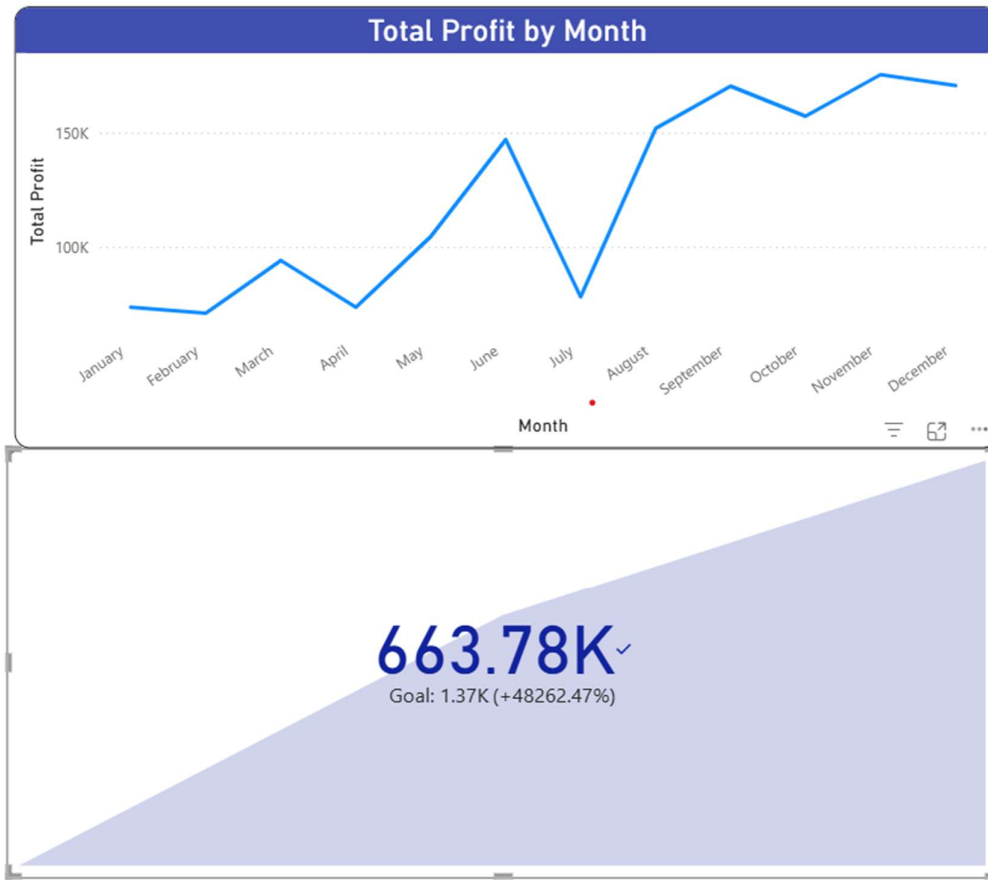
Question 7 : Write and apply the following measures:

- 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         |

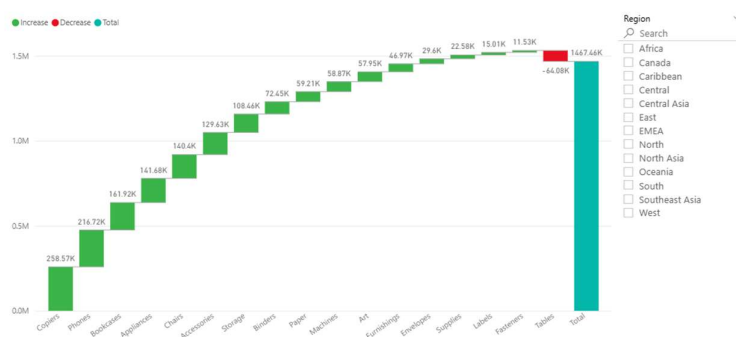
|                  |      |
|------------------|------|
| Tables & Chairs  | 8000 |
| Toy              | 1500 |
| Sports Equipment | 1200 |
| Office Supplies  | 1000 |
| Beauty Products  | 4400 |
| Garden Supplies  | 1000 |
| Jewelry          | 1800 |
| Automotive       | 2600 |

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

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 reveals that *Copiers* and *Phones* generate the most profit, whereas *Tables* negatively impact overall earnings.

Enhancing sales strategies for high-profit items and optimizing expenses for low-performing categories can strengthen total profitability.

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.

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 DATASET

**LINK: Health\_activity\_data**

