

Question 1 – Define Power BI & Key Components of the Power BI Ecosystem

Definition:

Power BI is a business intelligence and data visualization tool by Microsoft that enables users to connect to multiple data sources, transform and model the data, and create interactive reports and dashboards to derive insights and support data-driven decision making.

Key Components:

1. Power BI Desktop

- A Windows desktop app where developers *import, transform, model data, and build reports* with visuals.
- This is where data sources are connected, queries are shaped (Power Query), relationships are created, and DAX calculations are added.
- Reports created here are saved as .pbix files.

2. Power BI Service

- The *cloud-based* platform (SaaS) where reports and datasets from Desktop are published.
- Enables distribution, sharing, collaboration, scheduled data refresh, and creation of dashboards.
- Accessible through a browser.

3. Power BI Mobile

- Mobile applications for Android, iOS, and Windows devices.
- Let users view and interact with dashboards and reports on the go.
- Good for executives or field teams needing real-time insights.

4. Power BI Gateway

- Bridges *on-premises* data sources with the Power BI Service securely.
- Allows scheduled refresh of data and live connection to internal databases.
- Without it, cloud service can't refresh internal data automatically.

Question 2 – Compare Power BI Visuals

Pie Chart vs Donut Chart

Feature	Pie Chart	Donut Chart
Shape	Full circle	Ring with hole
Key Use	Shows proportion of categories to whole	Same as pie but cleaner center space
When to Prefer	Simple segment comparison	When you want label or center space for metrics

Example:

- *Pie Chart*: Share of total sales by product category.
- *Donut Chart*: Website traffic share by channel with total visits displayed in the center.

When one is better:

Donut is often easier to read when you also want a central metric or avoid visual clutter.

Bar Chart vs Column Chart

Feature	Bar Chart	Column Chart
Orientation	Horizontal bars	Vertical columns
Best for	Long category names, comparing categories	Showing changes over time/groups

Example:

- *Bar Chart*: Compare sales volume by region (e.g., North, South).
- *Column Chart*: Monthly revenue trends over the year.

When one is better:

Use *bar charts* if category names are long or too many categories; use *column charts* for time-based comparisons.

Question 3 – Significance of Schemas and Keys

Star Schema vs Snowflake Schema

Star Schema:

- Simple structure with one central *fact table* linked to multiple *dimension tables* (straight lines, no branching).
- Easier for report building and tends to perform faster due to fewer joins.
- Understandable for business users.

Snowflake Schema:

- Extension of star schema with *normalized dimensions* that link to sub-dimension tables.
- Reduces redundancy but increases complexity and join paths.
- Can be useful for very large, normalized datasets.

Primary Key vs Foreign Key

- **Primary Key (PK):** Uniquely identifies each row in a table (no duplicates).
- **Foreign Key (FK):** A column in one table that references a PK in another table to create relationships.
- In Power BI, relationships are built using PK-FK pairs.

Why is Cardinality Important?

Cardinality defines the relationship type between tables (one-to-many, many-to-one, many-to-many, one-to-one).

Correct cardinality ensures *accurate filtering, aggregation, and DAX results* in reports.

Question 4 – Calculated Column vs Measure

Feature	Calculated Column	Measure
When evaluated	During data refresh	Runtime (when report interacts)
Stored in model?	Yes	No
Use	Row-level data calculations	Aggregated calculations

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

Example:

- *Calculated Column:* Combine first and last name for display.
- *Measure:* Sum total revenue on visuals.

Row Context vs Filter Context

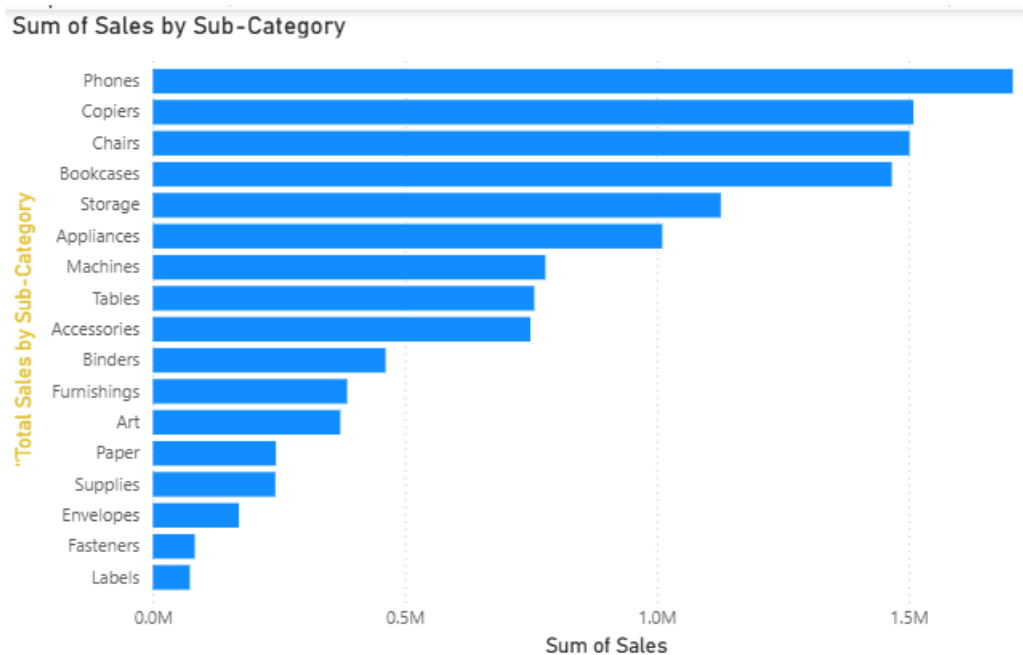
- **Row Context:** Applies to each row individually (used in calculated columns).
Example: If you calculate Profit = Sales - Cost for each row.
- **Filter Context:** Applies filters from visuals, slicers, and DAX functions to control what data is included in measures.
Example: Total sales measure filtered by a selected year on a slicer.

Question 5 – Report vs Dashboard in Power BI

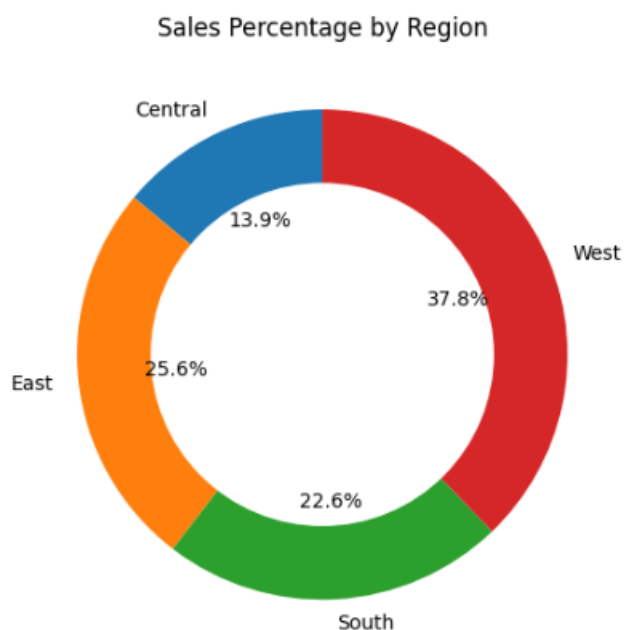
Feature	Report	Dashboard
Pages	Multi-page	Single canvas
Content	Visuals from one dataset	Visuals pinned from many reports/datasets
Interactivity	Filters, slicers across pages	Tiles with limited interaction
Use	Detailed analysis	Snapshot or KPI view

Question 6 : Using the Sample Superstore

- 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



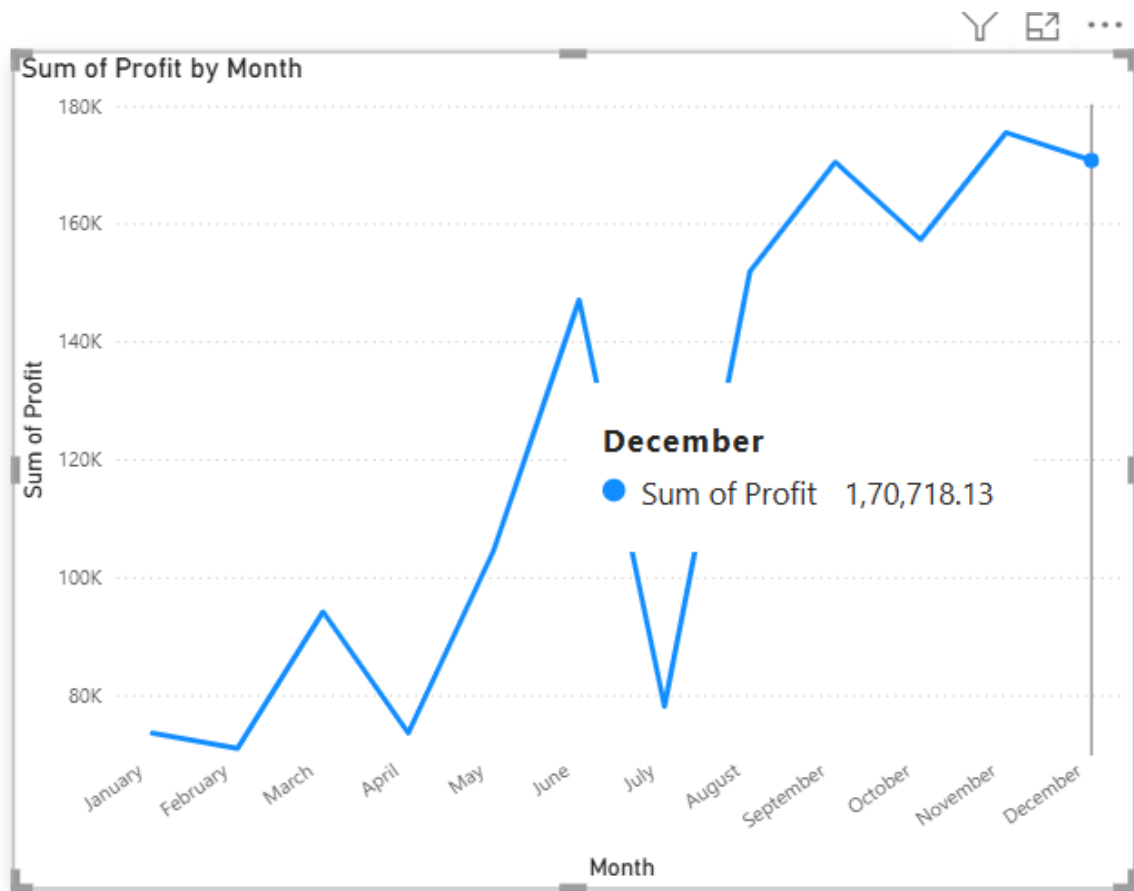
Question 7 : Write and apply the following measures:

- Total Profit = $\text{SUM}([\text{Profit}])$
- 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..

KPI Cards

Total Profit
47000

Average Discount
16.17%



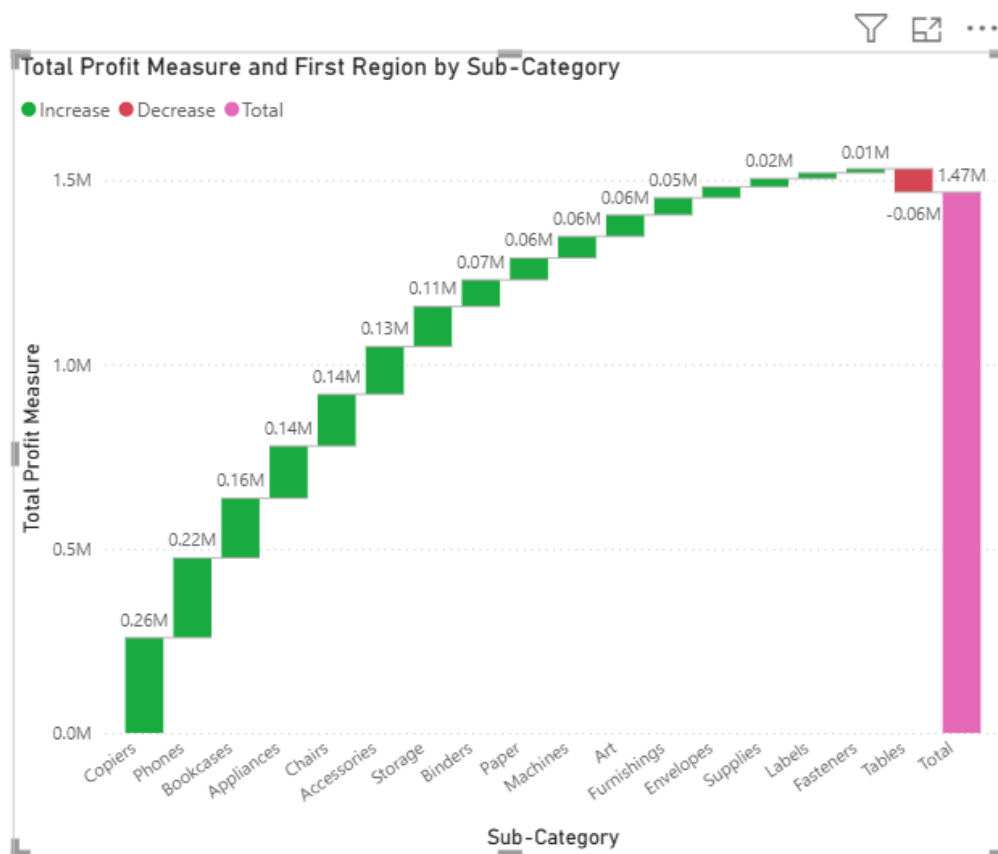
Question 8 : Implement a DAX measure that calculates the percentage of total sales by product category

. 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

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. Provide a steps, screenshot of the Waterfall chart and the DAX formula



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