### 

1. **What is Power BI?  
    *Power BI is a business analytics service by Microsoft that enables users to visualize, analyze, and share data through interactive reports and dashboards.***
2. **What are the main components of Power BI?  
    *Power BI Desktop, Power BI Service, Power BI Mobile, Power BI Gateway, and Power BI Report Server.***
3. **What is Power BI Desktop?  
    *A Windows-based application used to design and create reports and data models.***
4. **What is the Power BI Service?  
    *A cloud-based SaaS platform to publish, share, and collaborate on reports.***
5. **What is Power BI Mobile?  
    *An app for viewing Power BI dashboards and reports on mobile devices.***
6. **What is the Power BI Gateway?  
    *A bridge that connects on-premises data sources to the Power BI cloud service.***
7. **What is Power BI Report Server?  
    *An on-premises server for hosting and managing Power BI reports locally.***
8. **What file format does Power BI Desktop use?  
    *.pbix***
9. **Who developed Power BI?  
    *Microsoft***
10. **What are the benefits of using Power BI?  
     *Power BI enables data-driven decision-making through real-time insights, interactive dashboards, and scalable sharing options.***
11. **What data sources can Power BI connect to?  
     *Excel, CSV, SQL Server, Azure, Web APIs, SharePoint, Oracle, MySQL, and more.***
12. **What is DirectQuery in Power BI?  
     *A mode that allows real-time querying of data without importing it into Power BI.***
13. **What is Power Query?  
     *The data preparation engine used to import, clean, and transform data.***
14. **What is Power Pivot?  
     *A data modeling tool for managing relationships and calculations using DAX.***
15. **What is a dataset in Power BI?  
     *A collection of data used to build visuals in reports.***
16. **What are the different views in Power BI Desktop?  
     *Report View, Data View, and Model View.***
17. **What is Report View used for?  
     *To design and view visuals and reports.***
18. **What is Model View used for?  
     *To manage relationships between tables.***
19. **What is Data View used for?  
     *To explore data in a table-like format.***
20. **What is a relationship in Power BI?  
     *A connection between tables using keys to enable cross-table calculations.***
21. **What is cardinality in Power BI relationships?  
     *It defines how many rows in one table relate to rows in another: one-to-many, many-to-many, etc.***
22. **What is a primary key?  
     *A unique column in a table used to relate to other tables.***
23. **What is a foreign key?  
     *A column in a table that connects to the primary key of another table.***
24. **What is an active relationship?  
     *The default relationship used in report calculations.***
25. **Can a table have multiple relationships?  
     *Yes, but only one can be active at a time.***
26. **What is the difference between a report and a dashboard in Power BI?  
     *A report is multi-page and detailed; a dashboard is a single-page summary made of pinned visuals.***
27. **When should you use a stacked bar chart?  
     *To compare parts of a whole across categories using horizontal bars.***
28. **What does a 100% stacked column chart show?  
     *Proportions of subcategories adding up to 100% per category.***
29. **When to use a line chart in Power BI?  
     *For showing trends over time.***
30. **What is a ribbon chart used for?  
     *To display category rank changes over time.***
31. **What is a funnel chart used for?  
     *To visualize sequential stages in a process like a sales pipeline.***
32. **What does a matrix visual do?  
     *Displays pivot-style data with rows, columns, and values.***
33. **What is the difference between a card and a multi-row card?  
     *A card shows a single value; a multi-row card displays multiple values in a structured format.***
34. **What is a scatter chart used for?  
     *To analyze relationships or correlations between two numerical fields.***
35. **What is a map visual used for?  
     *To plot data points based on geographic locations.***
36. **What is DAX?  
     *DAX (Data Analysis Expressions) is a formula language for creating measures and calculated columns.***
37. **What is the difference between a calculated column and a measure?  
     *Calculated columns operate row-by-row; measures aggregate values based on filter context.***
38. **What does the RANKX function do?  
     *Ranks values within a group or table based on a DAX expression.***
39. **What does the CALCULATE function do?  
     *Modifies filter context to evaluate an expression differently.***
40. **What is the purpose of the FILTER function in DAX?  
     *Returns a subset of a table based on specified conditions.***
41. **What are filters in Power BI?  
     *Filters restrict the data shown in visuals based on selected criteria.***
42. **What is a slicer in Power BI?  
     *A visual element that allows users to interactively filter reports.***
43. **What is cross-filter direction?  
     *Controls how filters propagate between related tables (single or both directions).***
44. **What is auto-detect in Power BI relationships?  
     *A feature where Power BI automatically detects and creates relationships between tables.***
45. **What is the ALL function in DAX?  
     *Removes filters from a table or column to calculate values in a broader context.***

### ***Power BI Visualization Guide***

#### ***Chart Types for Comparison:***

***Bar Charts:***

* ***Bar Chart - Compares values across categories horizontally; ideal when category names are long***
* ***Clustered Bar Chart - Compares multiple categories side-by-side using horizontal bars***
* ***Stacked Bar Chart - Shows sub-category totals across a single axis using horizontal bars***
* ***100% Stacked Bar Chart - Shows percentage contribution of each sub-category across categories***

***Column Charts:***

* ***Column Chart - Compares values across vertical bars; simple and effective for comparison***
* ***Clustered Column Chart - Displays multiple series grouped by category with vertical columns***
* ***Stacked Column Chart - Shows total and sub-category values vertically for easy comparison***
* ***100% Stacked Column Chart - Analyzes relative percentage of each component in vertical stack***

### ***Trend Analysis Charts:***

***Line Charts:***

* ***Line Chart - Most useful for visualizing trends and changes in data over time***
* ***Line and Stacked Column Chart - Compares trends and total values using dual axes***
* ***Line and Clustered Column Chart - Analyzes detailed series values along with trend line***

***Area Charts:***

* ***Area Chart - Shows magnitude over time with filled areas beneath lines***
* ***Stacked Area Chart - Shows part-to-whole relationships over time with cumulative areas***
* ***100% Stacked Area Chart - Depicts proportional contribution of each category over time***

### ***Specialized Charts:***

***Process & Flow Charts:***

* ***Funnel Chart - Visualizes sequential stages in a process (sales conversion, workflow stages)***
* ***Waterfall Chart - Shows step-by-step changes in value, visualizing cumulative effects of sequential positive and negative values***
* ***Ribbon Chart - Displays rank changes of categories over time with colored ribbons***

***Relationship Charts:***

* ***Scatter Chart - Helps identify correlations or patterns between two numerical variables***
* ***Combo Chart - Combines column and line chart to compare trends and values simultaneously***

***Proportion Charts:***

* ***Pie Chart - Shows proportions of categories within a whole (best for few categories)***
* ***Donut Chart - Represents part-to-whole relationships with central space for labels***
* ***Treemap - Displays hierarchical data as nested rectangles sized by value***

### ***Performance & KPI Visuals:***

***Single Value Displays:***

* ***Card - Displays a single summary value for key metrics***
* ***Multi-Row Card - Displays multiple values in card format for grouped KPIs***
* ***Gauge Chart - Shows a single value compared against a target using dial-style indicator***
* ***KPI Visual - Compares current value with target and trend for strategic progress tracking***

***Data Tables:***

* ***Table - Shows detailed row-wise data when precise values and detailed reporting is required***
* ***Matrix - Pivot-style summary table with rows, columns, and aggregated values for cross-tab analysis***

### ***Geographic Visuals:***

* ***Map - Plots data based on geographic location using scatter plot style***
* ***Filled Map - Colors areas on map based on values for intensity comparison across regions***

### ***Advanced Analysis:***

* ***Decomposition Tree - Breaks a metric into multiple dimensions for root-cause analysis***
* ***Slicer - Visual control that allows users to interactively filter data in reports***

**Measures vs Calculated Columns**

| **Feature** | **Measures** | **Calculated Columns** |
| --- | --- | --- |
| **Calculation Level** | **Aggregation level (context-based)** | **Row level (each row in the table)** |
| **Storage** | **Not stored in memory** | **Stored as part of the table** |
| **Use Case** | **KPIs, totals, averages, percentages** | **Filtering, sorting, relationships** |
| **Example** | **Total Sales = SUM(Sales[Amount])** | **Profit = Sales[Amount] - Sales[Cost]** |

**Aggregation Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **SUM** | **Total of numeric column** | **SUM(Sales[Amount])** |
| **AVERAGE** | **Mean of values in a column** | **AVERAGE(Orders[Quantity])** |
| **MAX** | **Maximum value** | **MAX(Employees[Salary])** |
| **MIN** | **Minimum value** | **MIN(Employees[Salary])** |

**Count Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **COUNT** | **Count of non-blank entries in column** | **COUNT(Orders[OrderID])** |
| **COUNTA** | **Count of non-empty cells** | **COUNTA(Products[Name])** |
| **COUNTROWS** | **Total rows in a table** | **COUNTROWS(Orders)** |

**Logical Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **IF** | **Returns value based on condition** | **IF(Sales[Amount] > 1000, "High", "Low")** |
| **ISBLANK** | **Checks if a value is blank** | **IF(ISBLANK(Sales[Amount]), 0, Sales[Amount])** |
| **SWITCH** | **Evaluates conditions sequentially** | **SWITCH(TRUE(), Grade > 90, "A", Grade > 80, "B", "F")** |

**Filter Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **CALCULATE** | **Changes context for evaluation (core DAX engine)** | **CALCULATE(SUM(Sales[Amount]), Region = "South")** |
| **FILTER** | **Returns a table filtered on a condition** | **FILTER(Sales, Sales[Amount] > 1000)** |
| **ALL** | **Removes filters from a column or table** | **CALCULATE(SUM(Sales[Amount]), ALL(Sales))** |

**Table Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **DISTINCT** | **Returns unique values** | **DISTINCT(Products[Category])** |
| **VALUES** | **Returns column values in current context** | **VALUES(Sales[Region])** |
| **RELATED** | **Retrieves values from a related table** | **RELATED(Products[ProductName])** |

**Ranking Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **RANKX** | **Ranks based on expression** | **RANKX(ALL(Products), SUM(Sales[Amount]))** |
| **RANK** | **(Excel DAX only; use RANKX in Power BI)** | **Use RANKX instead** |

**Time Intelligence Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **TOTALYTD** | **Year-to-date total** | **TOTALYTD(SUM(Sales[Amount]), Dates[Date])** |
| **DATEADD** | **Shifts dates forward or backward** | **DATEADD(Dates[Date], -1, MONTH)** |

**Mathematical Functions**

| **Function** | **Description** | **Example** |
| --- | --- | --- |
| **DIVIDE** | **Division with error handling** | **DIVIDE(Sales[Amount], Sales[Units])** |