Power BI Cheat Sheet for Data Analysts and Data Scientists

Power BI Basics

- Power Query: ETL (Extract, Transform, Load) tool in Power BI for data preparation.

  - Common Functions:

    - Merge Queries: Combine data from multiple tables based on a key.

    - Append Queries: Stack data from multiple tables vertically.

    - Split Columns: Separate a single column into multiple columns using delimiters.

    - Replace Values: Replace specific values in a column.

    - Conditional Columns: Add columns based on conditional logic.

- Data Modeling:

  - Create Relationships between tables:

    - Cardinality: One-to-Many, Many-to-Many.

    - Direction: Single or Bi-directional.

  - Use Fact and Dimension Tables for optimized models.

  - Active/Inactive Relationships: Control which relationship is used by default.

- Visualizations:

  - Common Visuals: Bar chart, Line chart, Pie chart, Treemap, Table, Matrix.

  - Advanced Visuals: Decomposition Tree, Key Influencers, Q&A.

  - Interactivity:

    - Use Sync Slicers across pages.

    - Edit Interactions to control filter behavior.

- Add Drill Through for detailed analysis.

Key DAX Functions

- Aggregations:

  - SUM(), AVERAGE(), COUNT(), DISTINCTCOUNT().

  - SUMX(): Perform row-by-row calculations in a table.

- Time Intelligence:

  - DATEADD(): Shift dates forward or backward.

  - YTD(), MTD(), QTD(): Year-to-Date, Month-to-Date, Quarter-to-Date.

  - CALENDAR(), CALENDARAUTO(): Generate date tables.

- Filtering:

  - CALCULATE(): Modify a measure based on filters.

  - FILTER(): Apply advanced row-level filters.

  - ALL(): Ignore filters.

  - RELATED(): Access related table values.

- Text Functions:

  - CONCATENATE(), LEFT(), RIGHT(), SEARCH(), FORMAT().

- Iterative Functions:

  - SUMX(), AVERAGEX(), MINX(), MAXX().

Statistics in Power BI

- Descriptive Statistics:

  - Aggregates: Use visuals or DAX for SUM(), AVERAGE(), MIN(), MAX().

  - Variance and Standard Deviation:

    - VAR(), STDEV(), VARP(), STDEVP() (population variance).

- Advanced Analytics:

  - Decomposition Tree: Identify factors contributing to KPIs.

  - Key Influencers: Analyze drivers of a metric.

  - Forecasting: Line charts with predictive trends.

- Histogram Creation:

  - Use Bins in Power BI or Power Query for range grouping.

MySQL Integration with Power BI

- Connecting MySQL to Power BI:

  - Install the MySQL Connector.

  - In Power BI:

    - Go to Home -> Get Data -> MySQL Database.

    - Enter server details (host, port) and credentials.

    - Load data into Power Query for transformation.

- Best Practices:

  - Optimize queries in MySQL using EXPLAIN and indexes before importing.

- Use Views for reusable queries and simplify integration.

- Example Queries for Integration:

   SELECT

      product_id,

      SUM(sales_amount) AS total_sales

   FROM sales

   GROUP BY product_id;

   SELECT

      customers.customer_name,

      orders.order_date,

      orders.total_amount

   FROM customers

   JOIN orders ON customers.customer_id = orders.customer_id;

- DirectQuery vs Import:

  - DirectQuery: Real-time data access but slower performance.

  - Import: Faster reports but requires data refresh.

Power BI with MySQL for Statistical Analysis

1. Prepare Data:

  - Use MySQL to compute key metrics like averages, medians, and variances before importing.

  - Create calculated fields in MySQL for heavy computations.

2. Statistical DAX Measures:

   - After importing, create measures for additional insights.

     - Example:

       Mean Sales = AVERAGE(Sales[Amount])

       Sales Variance = VAR(Sales[Amount])

3. Visualize:

   - Combine MySQL datasets with Power BI's visuals for insights like customer churn, profitability, and forecast trends.

Tips for Power BI and MySQL Integration

- Use Parameter Queries in Power BI to filter large datasets at the source.

- Optimize MySQL queries to reduce data volume.

- Leverage Power Query transformations for data cleaning and formatting.

Advanced Topics

- Row-Level Security (RLS):

  - Create roles in Power BI to limit data visibility.

  - Use DAX filters for dynamic security based on user roles.

- Scheduled Refresh:

  - Set up data refresh in Power BI Service for MySQL-connected reports.

  - Use Data Gateways for on-premises databases.

- Custom SQL Queries:

  - Directly write SQL queries in Power BI's MySQL connector to fetch specific data.

Cheat Sheet Usage Tips

- Keep this handy for:

  - Preparing for interviews.

  - Troubleshooting Power BI/MySQL integration.

  - Quick reference during report creation.