**Overview of Data Analysis Expressions (DAX) in Power BI**

Data Analysis Expressions (DAX) is a formula language used in Power BI create custom calculations and aggregations on data models. DAX is similar to Excel formulas but is optimized for working with relational data and performing advanced analytics in Power BI.

**Key Features of DAX**

1. Calculated Columns:
   * Create new columns in tables using DAX expressions.
   * Computed row by row when data is refreshed.
   * Example:
   * TotalPrice = Sales[Quantity] \* Sales[UnitPrice]
2. Measures:
   * Perform dynamic aggregations (e.g., sums, averages, counts).
   * Calculated at query time, improving performance.
   * Example:
   * TotalSales = SUM(Sales[Amount])
3. Calculated Tables:
   * Create new tables using DAX queries.
   * Example:
   * NewTable = FILTER(Sales, Sales[Region] = "West")
4. Filtering & Row Context:
   * FILTER() applies row-level filtering in calculations.
   * Example:
   * FilteredSales = CALCULATE(SUM(Sales[Amount]), Sales[Category] = "Electronics")
5. Time Intelligence Functions:
   * Perform calculations over time (e.g., Year-to-Date, Previous Month).
   * Example:
   * YTD\_Sales = TOTALYTD(SUM(Sales[Amount]), Sales[Date])
6. Aggregation & Iterators:
   * SUMX, AVERAGEX, COUNTX allow row-by-row operations.
   * Example:
   * TotalRevenue = SUMX(Sales, Sales[Quantity] \* Sales[UnitPrice])

Common DAX Functions

| Category | Function Examples |
| --- | --- |
| Aggregation | SUM(), AVERAGE(), COUNT(), MAX(), MIN() |
| Logical | IF(), SWITCH(), AND(), OR(), NOT() |
| Filtering | FILTER(), ALL(), ALLEXCEPT(), KEEPFILTERS() |
| Time Intelligence | DATEADD(), TOTALYTD(), PREVIOUSMONTH(), SAMEPERIODLASTYEAR() |
| Mathematical & Statistical | ABS(), ROUND(), DIVIDE(), RANKX(), STDEVX.P() |
| Text Functions | CONCATENATE(), LEFT(), RIGHT(), SEARCH(), FORMAT() |

Why Use DAX in Power BI

1. Enables advanced calculations and business logic.  
2. Provides flexibility for dynamic and custom reporting.  
3. Supports complex filtering and aggregations.  
4. Enhances data modeling for better insights.