

Putnam Analytics

Power BI Cheat Sheet

DAX functions · Operators · Data modeling · Visuals · Security · Workspaces

A branded quick-reference guide for analysts and report builders. Curated by Putnam Analytics, a Saratoga Labs brand.



This cheat sheet provides a quick reference for essential Power BI features and functionalities, helping you analyze data, create interactive reports, and design insightful dashboards with ease. It covers a wide range of categories, including data interaction, transformation, modeling, analytics, visualization, and workspace, ensuring you have the tools needed to perform tasks from basic data exploration to advanced scenario modeling.

Each entry includes clear syntax and concise explanations, paired with practical examples to demonstrate how the feature operates in real-world scenarios. Whether you’re writing DAX formulas, transforming or designing semantic models, or creating advanced visualizations, this cheat sheet simplifies Power BI’s robust capabilities.

Designed to be accessible and actionable, this resource is perfect for professionals, students, and business analysts looking to improve their efficiency and confidence in Power BI. Keep it handy for quick guidance on Power BI’s versatile functionality.

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DAX Functions

Syntax for	How to use	Explained
CALCULATE	<code>CALCULATE(Expression, Filters)</code>	Modifies the filter context of an expression, enabling advanced calculations like conditional totals or time intelligence analysis.
SUM	<code>SUM(Table[Column])</code>	Adds all numerical values in a column, commonly used in measures.
AVERAGE	<code>AVERAGE(Table[Column])</code>	Calculates the average of a column's numerical values.
TOTALYTD	<code>TOTALYTD(Table[Column])</code>	Calculates the Year-To-Date total for an expression.
LASTDATE	<code>LASTDATE(Dates[Column])</code>	Returns the last date in a given date column, often used in semi-additive measures.
PATH	<code>PATH(Table[Child_Column], Table[Parent_Column])</code>	Creates a string that shows the hierarchical path from a parent to a child.
USERELATIONSHIP	<code>USERELATIONSHIP(Table1[Column1], Table2[Column2])</code>	Activates an inactive relationship between two tables for a specific calculation.
CALENDAR	<code>CALENDAR(START_DATE, END_DATE)</code>	Generates a continuous range of dates between two specified dates.

Syntax for	How to use	Explained
CALENDARAUTO	<code>CALENDARAUTO()</code>	Automatically creates a date table based on the minimum and maximum values of date columns in the model.
RELATED	<code>RELATED(Table[Column])</code>	Retrieves a related value from another table using an existing relationship.
CONCATENATE	<code>CONCATENATE(Value1, Value2)</code>	Combines two values into a single text string.
DIVIDE	<code>DIVIDE(Numerator, Denominator, AlternateResult)</code>	Performs division while handling divide-by-zero errors gracefully by returning an alternate result.
IF	<code>IF(Condition, TrueResult, FalseResult)</code>	Evaluates a condition and returns different results based on whether the condition is true or false.
DISTINCTCOUNT	<code>DISTINCTCOUNT(Table[Column])</code>	Counts the number of unique values in a column.
RANKX	<code>RANKX(Table, Expression, Value, Order, Ties)</code>	Returns the rank of a value in a table based on an expression, with options for handling ties.



DAX Functions

Syntax for	How to use	Explained
SWITCH	<code>SWITCH(Expression, Value1, Result1, [Value2, Result2], ..., [ElseResult])</code>	Evaluates an expression and returns a matching result for the first case.
FORMAT	<code>FORMAT(Value, FormatString)</code>	Formats a value as a string using a specified format (e.g., currency, percentage).
VALUES	<code>VALUES(Table[Column])</code>	Returns a single-column table with unique values from the specified column.
EARLIER	<code>EARLIER(Column, Offset)</code>	Refers to a row context in an earlier iteration of the same calculation.
ALLEXCEPT	<code>ALLEXCEPT(Table, Column1, Column2, ...)</code>	Removes all filters except those applied to the specified columns.
FILTER	<code>FILTER(Table, Condition)</code>	Returns a table that contains only rows matching a specified condition.
ALL	<code>ALL(Table[Column])</code>	Removes all filters from a table or column, returning all rows.
HASONEVALUE	<code>HASONEVALUE(Table[Column])</code>	Returns <code>TRUE</code> if the column contains only one distinct value in the current filter context.

Syntax for	How to use	Explained
MAX	<code>MAX(Table[Column])</code>	Returns the largest numeric value in a column.
MIN	<code>MIN(Table[Column])</code>	Returns the smallest numeric value in a column.
COUNTROWS	<code>COUNTROWS(Table)</code>	Counts the number of rows in a table.
SUMMARIZE	<code>SUMMARIZE(Table, GroupByColumnName, [Name, Expression], ...)</code>	Groups data by specified columns and calculates aggregated values.
LOOKUPVALUE	<code>LOOKUPVALUE(Result_Column, Search_Column, Search_Value, [Search_Column2, Search_Value2])</code>	Returns the value of a result column based on search criteria.
ISBLANK	<code>ISBLANK(Value)</code>	Returns <code>TRUE</code> if the specified value is blank.
ROUND	<code>ROUND(Number, NumDigits)</code>	Rounds a number to the specified number of digits.



DAX Operators

Syntax for	How to use	Explained	Syntax for	How to use	Explained
Addition (+)	<code>Sales[Amount] + Sales[Tax]</code>	Adds two numerical values or columns.	Less Than (<)	<code>Sales[Price] < 100</code>	Checks if one value is less than another.
Subtraction (-)	<code>Sales[Amount] - Sales[Discount]</code>	Subtracts one numerical value or column from another.	Greater Than or Equal (>=)	<code>Sales[Price] >= 100</code>	Checks if one value is greater than or equal to another.
Multiplication (*)	<code>Sales[Price] * Sales[Quantity]</code>	Multiplies two numerical values or columns.	Less Than or Equal (<=)	<code>Sales[Price] <= 100</code>	Checks if one value is less than or equal to another.
Division (/)	<code>Sales[Total] / Sales[Units]</code>	Divides one numerical value or column by another.	Logical AND (&&)	<code>(Sales[Price] > 100) && (Sales[Units] > 10)</code>	Returns <code>TRUE</code> if both conditions are true.
Exponentiation (^)	<code>Value ^ 2</code>	Raises a number to the power of another number.	Logical OR ()	<code>(Sales[Price] > 100) (Sales[Units] > 10)</code>	Returns <code>TRUE</code> if at least one condition is true.
Concatenation (&)	<code>Customer[FirstName] & " " & Customer[LastName]</code>	Combines two text strings into one.	Logical NOT (NOT)	<code>NOT(Sales[Category] = "Electronics")</code>	Reverses the logical value of an expression (<code>TRUE</code> to <code>FALSE</code> and vice versa).
Equal To (=)	<code>Sales[Category] = "Electronics"</code>	Compares two values for equality.	Inclusion (IN)	<code>Sales[Category] IN {"Electronics", "Books"}</code>	Checks if a value exists in a specified list of values.
Not Equal To (<>)	<code>Sales[Category] <> "Electronics"</code>	Compares two values for inequality.			
Greater Than (>)	<code>Sales[Price] > 100</code>	Checks if one value is greater than another.			



DAX Operators

Syntax for	How to use	Explained
Parenthesis (())	(Sales[Price] * Sales[Units]) + Sales[Tax]	Groups expressions or specifies the order of operations in calculations.
Table Constructor ({})	{1, 2, 3}	Creates a table with a single column containing the listed values.
Equality for Relationships (=)	Customer[ID] = Sales[CustomerID]	Creates relationships between tables based on key columns.



Data Interaction

Syntax for	How to use	Explained
Power BI Workflows	> Connect to data > Transform and model data > Create visualizations > Publish and share	Workflow includes importing data from sources like Excel or CSV, transforming data in Power Query Editor, building reports, and sharing insights via Power BI Service.
Connect to Data	> Home > Get data > Select File Type (e.g., CSV, Excel) > Open File > Load or Transform Data 	Easily connect to various data sources like Excel, CSV, XML, or databases, and load them into Power BI for further processing.
Data Transformation	> Home > Transform Data > Use Power Query Editor 	Clean and shape your data, such as renaming columns, filtering rows, and changing data types, to prepare it for analysis.
Publish Reports	> File > Publish > Power BI Service	Share your reports with others by publishing them to Power BI Service, where dashboards and access can be managed.
Manage Data Sources	> Transform Data > Data Source Settings > Change Source 	Update data source paths or settings to maintain the accuracy of your reports when file locations change.



Data Modeling

Syntax for

How to use

Explained

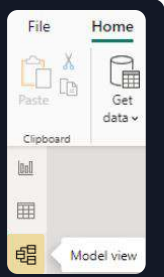
Syntax for

How to use

Explained

View Model
Layout

- > Home Tab
- > **Model view**
- > View Diagram



Allows managing table relationships, creating measures, and organizing data for effective data modeling.

Create
Relationships

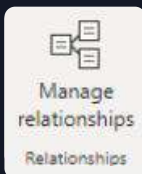
- > Modeling Tab
- > **Manage Relationships**
- > New
- > Choose Columns
- > Define Cardinality



Establish connections between tables using key columns, defining cardinality (e.g., many-to-one, one-to-one).

Autodetect
Relationships

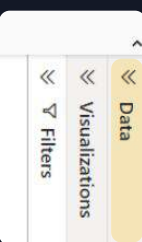
- > Modeling Tab
- > **Manage Relationships**
- > Autodetect



Automatically identifies and creates relationships between tables based on column names and data types.

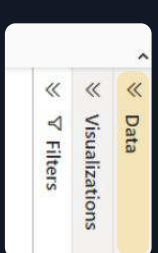
Mark a Table as
a Date Table

- > **Data Pane**
- > Right-click Table
- > Mark as Date Table
- > Select Date Column



Create DAX
Measures

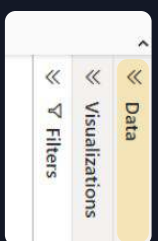
- > **Data Pane**
- > Right-click
- > New Measure



Use DAX to calculate values like sums, averages, or percentages, enabling dynamic and reusable calculations.

Create DAX
Calculated
Columns

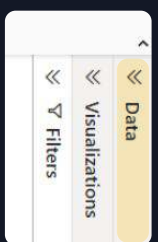
- > **Data Pane**
- > Right-click
- > New Column
- > Enter DAX Formula



Add new columns derived from existing ones, materialized into the dataset, increasing file size.

Hierarchies in
Dimension
Tables

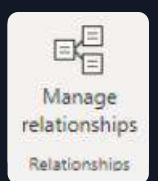
- > **Data Pane**
- > Right-click
- > New Hierarchy



Organize columns (e.g., Year > Month > Day) into a hierarchy for drill-down capabilities in visualizations.

Manage
Cardinality

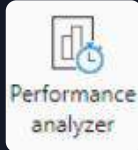
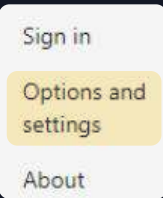
- > Modeling Tab
- > **Manage Relationships**
- > New
- > Define Cardinality (e.g., Many-to-One, One-to-Many)

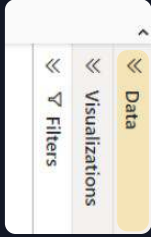
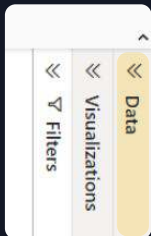


Adjusts how tables relate to each other (e.g., many-to-many for flexible connections).



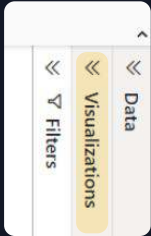
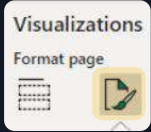
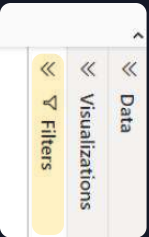
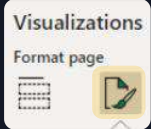
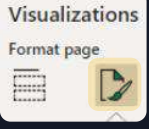
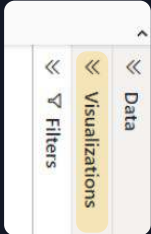
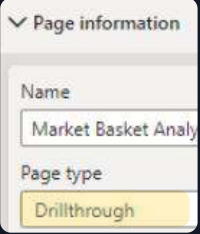
Data Modeling

Syntax for	How to use	Explained
Flatten Hierarchies	> Model Tab > View Diagram > Select Flattened Table Option 	Breaks down hierarchical relationships into a single-level table for simpler analysis.
Note: Diagram view is only available in Power Query Online.		
Performance Optimization	> View Tab > Performance Analyzer 	Analyzes report performance, identifying areas for improvement like visuals or DAX queries.
Aggregation Columns	> Power Query Editor > Group By > Add Aggregation 	Pre-aggregate data by grouping and summarizing at desired levels of detail.
Bidirectional Cross-Filtering	> Manage Relationships > Enable Bi-Directional Filtering 	Allows filters to flow both ways in relationships, ensuring comprehensive filtering.
Enable Auto Date/Time	> File > Options > Data Load > Auto Date/Time for New Files 	Automatically generates date hierarchies for date columns, simplifying time-based analysis.

Syntax for	How to use	Explained
Create Quick Measures	> Data Pane > Right-click > New Quick Measure 	Generate commonly used calculations like totals or averages without writing DAX.
Concatenate Columns	> Power Query Editor > Add Column > Custom Column > Define Concatenation Formula	Combine multiple columns into a single column (e.g., concatenating Year and Month to create "MonthYear").
Circular Relationship Detection	> Model Tab > Analyze Relationships > Resolve Circular References	Identifies and resolves circular dependencies in relationships to avoid calculation errors.
Use Aggregation Manager	> Data Pane > Right-click Table > Manage Aggregations 	Defines pre-aggregations for tables, improving performance when querying large datasets.

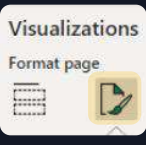
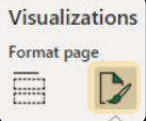
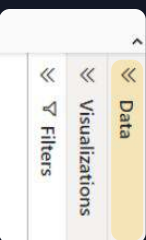
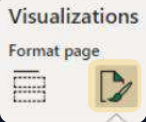


Power BI Visuals and Analytics

Syntax for	How to use	Explained	Syntax for	How to use	Explained
Add Visuals	> Visualizations Pane > Select Visual Icon (e.g., Table, Chart) 	Allows adding visuals such as tables, bar charts, line charts, etc., to represent data insights effectively.	Sorting Data	> More Options (Three Dots) > Sort Ascending/Descending or By Field	Organizes data logically, highlighting the most relevant information without removing any.
Tooltips	> Format Pane > Tooltip Section > Configure Custom Tooltip 	Adds customized hover-over descriptions for enhanced data context in visuals.	Filters	> Drag Fields to Filter Pane > Configure Filters 	Removes unnecessary data, enabling focus on relevant information in reports.
Conditional Formatting	> Format Pane > Conditional Formatting Options 	Specifies cell colors, data bars, KPI icons, or web links based on field values.	Background and Borders	> Format Pane > Background/Border Sections > Configure Color or Image 	Adds visual elements like colors or borders to highlight and isolate specific visuals on the canvas.
Add Slicer	> Visualizations Pane > Slicer Icon > Drag Fields to Slicer Visualization 	Adds a slicer to filter data interactively by specific criteria (e.g., year or region).	Drillthrough	> Add Drillthrough Fields > Configure Target Page 	Allows users to navigate to detailed pages for in-depth analysis by clicking on a specific field or value.



Power BI Visuals and Analytics

Syntax for	How to use	Explained	Syntax for	How to use	Explained
Bookmarks	> View Tab > Bookmarks > Add Bookmark 	Saves the current view of a report page for quick access, enhancing navigation and storytelling.	Add Alt Text	> Format Pane > General Section > Alt Text > Enter Description 	Ensures accessibility by providing descriptions for visuals that screen readers can interpret.
Buttons	> Insert Tab > Buttons > Add Button > Configure Action (e.g., Page Navigation) 	Adds interactive buttons for navigation or specific actions in a report.	Key Performance Indicators (KPIs)	> Visualizations Pane > KPI Icon > Add Value, Goal, and Time Frame 	Tracks performance against a target using metrics, goals, and timelines (e.g., total sales vs. sales target).
Align and Distribute Visuals	> CTRL + Click Visuals > Format Tab > Align/Distribute Options 	Aligns and evenly distributes visuals on the canvas for a clean, professional layout.	Clustering	> Scatter Chart > More Options > Automatically Find Clusters	Analyzes and groups similar data points in a scatter chart based on attribute values.
Hierarchy	> Data Pane > Drag Fields to Create Hierarchy 	Groups data into hierarchical levels (e.g., Year > Month > Day) for drill-down capabilities.	Top N Analysis	> Filters Pane > Field > Filter Type > Top N 	Displays the top N records based on a selected value (e.g., Top 10 selling products).



Power BI Visuals and Analytics

Syntax for

How to use

Explained

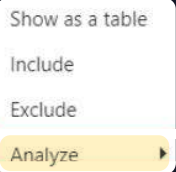
Histograms
and Bell
Curves

Use Column Charts for Histograms;
Use Area Charts for Bell Curves

Represents statistical data distributions for insights into data patterns.

Analyze
Feature

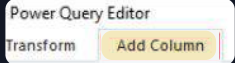
> Right-click Visual Data Point
> Analyze
> Choose Option (Explain Increase or Distribution Differences)



Provides AI-generated insights into why data has changed or its distribution differences.

AI Insights

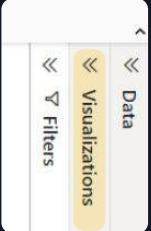
> Power Query Editor
> Add Column Tab
> Select Text Analytics, Vision, or Azure Machine Learning



Applies pretrained machine learning models for tasks like sentiment analysis, image processing, or anomaly detection.

Key
Influencers
Visual

> Visualizations Pane
> Key Influencers Icon
> Add Metric to Analyze and Dimensions to Explain By



Identifies and ranks factors that influence a specific metric, aiding in root cause analysis.

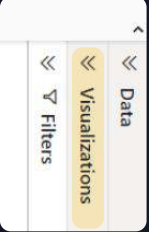
Syntax for

How to use

Explained

Decomposition Tree

> Visualizations Pane
> Decomposition Tree Icon
> Add Fields to Analyze and Explain



Allows data exploration across multiple dimensions, providing insights into high and low values in hierarchical data.

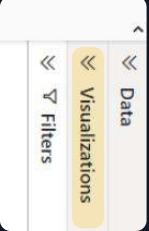
Q&A Visual

> Double-Click Canvas
> Enter Natural Language Question

Uses natural language processing to generate visual answers to data-related questions.

Statistical
Summary

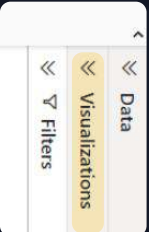
> Visualizations Pane
> Add Summary Visual



Provides quick descriptive statistics like averages, distributions, and clusters for high-level insights.

Advanced
Analytics
Visuals

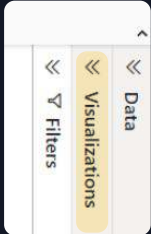
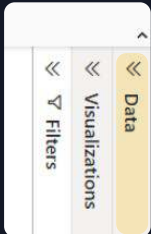
> Visualizations Pane
> Get More Visuals
> Select Advanced Analytics Category



Imports specialized visuals from Microsoft AppSource for complex analytical needs.



Power BI Visuals and Analytics

Syntax for	How to use	Explained
Time Series Analysis	> Use Line Charts, Gantt Charts, or Area Charts	Tracks and visualizes data trends over time, useful for identifying disruptions or seasonal patterns.
Slicers	> Visualizations Pane > Slicer Icon > Add Field to Slicer 	Filters data interactively by categories such as time or geography, enabling segmentation of data.
Custom Bin Groups	> Data Pane > Right-click Field > New Group > Set Bin Size 	Groups continuous data (e.g., numerical values or dates) into equal intervals for better analysis.
Quick Insights	> Power BI Web Service > Report > More Options > Quick Insights	Automatically generates insights using machine learning algorithms, ideal for initial dashboard exploration.



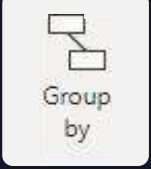
Transform Data in Power BI

Syntax for	How to use	Explained
Promote Headers	> Home > Use First Row as Headers 	Converts the first row of data into column headers.
Rename Queries	> Queries Pane > Right-click on Query > Rename 	Updates query names to make them meaningful and organized.
Rename Columns	> Right-click on column > Rename OR Double-click column header > Enter new name	Updates column names for clarity and organization of the dataset.
Replace Values	> Transform Tab > Replace Values > Enter Value to Find and Replace > Close & Apply 	Substitutes specific values or nulls with new ones to resolve inconsistencies or make values user-friendly.
Remove Rows	> Select rows > Home > Remove Rows > Remove Top Rows 	Deletes unnecessary rows to clean the dataset and improve analysis accuracy.



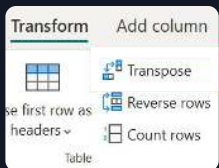
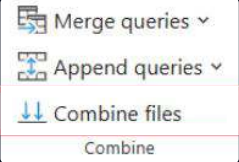
Transform Data in Power BI

Syntax for	How to use	Explained
Remove Columns	> Select columns > Home > Remove Columns OR Remove Other Columns	Deletes unwanted columns or retains only necessary ones.
Remove Duplicates	> Right-click Column Header > Remove Duplicates	Eliminates duplicate values to ensure accuracy and uniqueness in data.
Pivot Columns	> Transform > Pivot Column > Select Value Column > Choose Aggregate Function	Summarizes data by converting rows into columns using aggregate functions like SUM , COUNT , or AVERAGE .
Unpivot Columns	> Select columns > Transform > Unpivot Columns	Converts column data into rows, enabling easier analysis of wide datasets.

Syntax for	How to use	Explained
Split Columns	> Home > Split Column > By Delimiter 	Divides a column into two or more based on a specified delimiter (e.g., comma, space).
Combine Columns	> Add Column > Custom Column > Concatenate values with delimiter 	Merges multiple columns into one, improving readability or preparing data for analysis.
Sort Columns	> Home > Sort Ascending/Descending > Choose column	Reorders data within a column alphabetically, numerically, or by other criteria.
Group By	> Transform > Group By > Select column(s) > Define operation (SUM, COUNT, etc.) 	Aggregates data based on selected columns to perform calculations like sums or counts.



Transform Data in Power BI

Syntax for	How to use	Explained	Syntax for	How to use	Explained
Merge Queries	> Home > Merge Queries > Choose Tables and Columns > Select Join Type 	Combines data from multiple queries into one using a join operation (e.g., INNER JOIN, OUTER JOIN).	Change Column Data Type	> Select Column > Transform Tab > Data Type > Choose Correct Data Type	Fixes data type issues by selecting the correct type for calculations and transformations.
Duplicate Columns	> Right-click column > Duplicate Column	Creates a copy of a column for further transformations without altering the original.	Find Anomalies	> View Tab > Data Preview > Check Column Distribution, Quality, and Profile	Identifies irregularities or quality issues in data through visual summaries like column statistics and value distributions.
Transpose Data	> Transform > Transpose 	Switches rows to columns or columns to rows for reformatting data.	Modify M Code	> View Tab > Advanced Editor > Edit Code > Click Done	Edits the underlying M code for advanced or customized transformations.
Fill Down/Up	> Transform > Fill > Fill Down or Fill Up 	Fills blank cells in a column with values from the cell above or below.	Add Conditional Columns	> Home > Add Column > Conditional Column > Define conditions and values	Adds a new column based on defined conditions (e.g., categorizing data into ranges).
Combine Files	> Home > Combine Files > Select Folder 	Consolidates data from multiple files (e.g., Excel or CSV) into one query.			



Workspaces and Security

Syntax for	How to use	Explained
Create a Workspace	> Power BI Service > Workspaces > Create a Workspace	Enables you to organize and collaborate on dashboards, reports, and datasets.
Assign Workspace Roles	> Workspace > Access > Add Email or Group > Assign Role (Admin, Member, Contributor, Viewer)	Defines user permissions for collaboration and content management within the workspace.
Deployment Pipelines	> Power BI Service > Deployment Pipelines > Create Pipeline > Configure Workspace	Manages content migration between development, testing, and production environments (Premium accounts only).
Lineage View	> Workspace > View Drop-Down > Lineage	Visualizes relationships between workspace artifacts (reports, datasets) and external dependencies.

Syntax for	How to use	Explained
Usage Metrics	> Workspace > Report > More Options > View Usage Metrics	Tracks performance and user interaction metrics for reports and dashboards.
Sensitivity Labels	> Power BI Desktop > Apply Sensitivity Labels > Publish	Protects sensitive data by specifying export permissions.
Scheduled Refresh	> Dataset > Settings > Scheduled Refresh	Automates data updates to ensure reports and dashboards display the latest information.
Promote and Certify Datasets	> Power BI Service > Dataset > Promote or Certify	Endorses high-quality datasets for organizational use, ensuring reliability and consistency.



Workspaces and Security

Syntax for	How to use	Explained
Test RLS Roles	> Power BI Desktop > Modeling Tab > View as Roles	Simulates role-specific views to verify correct implementation of row-level security.
Gateways for On-Premises Data	> Install Power BI Gateway > Configure Gateway in Power BI Service	Connects on-premises data sources to Power BI cloud services, enabling seamless data access and refresh.
Parameters for Dynamic Reports	> Power Query Editor > Manage Parameters > Create New Parameter > Replace Filter with Parameter	Enables dynamic filtering of reports based on user input or predefined values.

Syntax for	How to use	Explained
What-If Parameters	> Modeling Tab > New Parameter > Define Parameter > Create Measure	Runs scenario analysis by dynamically changing parameter values (e.g., forecasting sales impact with variable discounts).
Manage Semantic Models	> Power BI Desktop > Create Relationships > Define Star Schema	Organizes data into fact and dimension tables for optimized performance and analysis.
Create Dynamic Measures	DAX: Measure = SUM(Data[Field]) * Parameter[Value]	Dynamically changes calculations in reports based on input parameters.