PL 300 Handbook

Storage Modes

- **Import** - Copies Data from the source to Power BI, and can set up a scheduled refresh of data in the Power BI service. Tables are cached in the BI service.
- **Direct Query** - Live queries to the data source every time the visual is loaded or refreshed. Much closer to real-time data, it can be the ideal setting for Sales data. Tables with this setting aren't cached. Can return up to **1 million** records. Only the schema is loaded in the Power BI file, which reduces the size of the data model, but it will slow the visualisation depending on the underlying query used to generate the visualisation
- **Dual -** Tables with this setting can act as either cached or not, depending on the context of the query submitted to the Power BI semantic model. In some cases, you fulfill queries from cached data. In other cases, you fulfill queries by executing an on-demand query to the data source. reduces the data refresh time, due to cached data

Table	Storage mode
Sales	DirectQuery
SurveyResponse	Import
Date	Dual
Customer	Dual
Geography	Dual

- Power BI Desktop caches dimension tables, **Date**, **Customer**, and **Geography**, so load times of initial reports are fast when they retrieve slicer values to display.
- Power BI Desktop doesn't cache the **Sales** table. Power BI Desktop provides the following results by not caching this table:
    - Data-refresh times are improved, and memory consumption is reduced.
    - Report queries that are based on the **Sales** table run in **DirectQuery** mode. These queries might take longer but are closer to real time, because no caching latency is introduced.
- Report queries that are based on the **SurveyResponse** table are returned from the in-memory cache, and are therefore relatively fast.
- You can set the dimension tables (Customer, Geography, and Date) to Dual to reduce the number of limited relationships in the dataset, and improve performance.
- Import mode supports full access to Q&A and Quick insights features, while Direct query doesn’t support those features

Outlier Detection and Column Distribution

- Column Quality - Shows the percentage to data that is valid, Empty or contains an error
- Column Distribution - Number of unique rows and distribution of the columns

- Column Profile - Tells you the analysis of the top 1000 rows

Dashboards Vs Reports

- The dashboard is a single page and can only have static values from reports, no filter or slicer. Can only be created on the Power BI service. Read Only Tiles.

Data Modelling

- Star Schema - 1 fact and connected Dimension Tables
- Snowflake Schema - 1 fact and connected Dimension Tables, but Dimensions can have more Normalised dimension Tables
- Fact to Dimension will have a Many-to-One relationship
- Role Playing Dimension - There can be many relationships established between two tables, but only one can be active at a time. To use another relationship to calculate a measure or column, we can use the USERELATIONSHIP function. It makes the other relationship active for that calculation only. **USERELATIONSHIP can't be used with row-level security.**
- CALCULATE and CALCULATETOTAL are the only functions which can alter the filter context
- USERELATIONSHIP and FILTER can return the same calculation, but USERELATIONSHIP is much faster than FILTER, while FILTER can be used to apply a Complex row-level filter
- Time Intelligence functions in DAX allow you to have calculations based on Date and Time.
- DATE tables can be created using CALENDAR or CALENDARAUTO functions.
- **Explicit / Calculated Columns** - They are created by the formula returned in DAX that achieves summarization by using aggregation functions like SUM, AVERAGE, MIN and others to produce a scalar value result query time at query time (Measures are never stored in the Model). Represented by the calculator Symbol. Can be created from Report View, Data View and Model View
- Implicit Columns - They are the columns already present in the model which can be summarized by the report visual. Such as sales amount, represented by the sigma symbol
- Sales Amount - Implicit Measure, but Monthly sales amount for a particular region can be an Explicit measure based on how we have achieved those numbers
- Types of Quick Measures in POWER BI - Average per category, Time Intelligence measures, Running total and others
- Time Intelligence Measures - It enables you to manipulate data using periods, such as days, months and years. E.g. - CLOSINGBALANCEMONTH, DATEADD, CLOSINGBALANCEQUARTER, ENDOFYEAR, TOTALYTD, TOTALMTD, TOTALQTD
- Time Intelligence functions are disabled for quick measures against direct query tables due to performance implications.

https://learn.microsoft.com/en-us/dax/time-intelligence-functions-dax

Types of measures

- Additive Measures - Can be aggregated across all the dimensions, such as Total sales

- Semi-additive measures - Can be aggregated across some dimensions, such as Opening/Closing balance
- Non-Additive Measures - Cannot be aggregated across any dimensions, such as Profit margin
- **PATH Functions -** These functions are used to calculate the parent-child Hierarchy in the data model https://learn.microsoft.com/en-us/dax/understanding-functions-for-parent-child-hierarchies-in-dax
- Calculates DAX Tables - Can create a new table based on previous tables by Cloning, Summarization, Applying Filters, TOPN or UNION; this helps in preserving the 1st table as it is and makes a new table as per requirement
- In Power BI, you can have 5 levels of Data hierarchy.
- Q&A function for Power BI - This helps people to naturally interact with the report. It uses the best available visualisation based on the request by the user. It has several suggestions.By keeping the clear names for the columns and data well structured, one can use this feature effectively, Such as 'sales by product category'; One can also add synonyms in the BI report to help Q&A understand questions about your data
- Q/A - Can be converted into a chart and added to the report and dashboard

Optimizing Model Performance

- It helps us to fine-tune high-demand performance reports, optimize performance and enhance user experience.
- It logs the information for DAX query, Visual display and Other Evaluated parameters.
- Selecting correct data categories (geographical locations) and having a fixed decimal data type of currency and other decimal fields can improve performance
- Choosing the correct storage mode can also improve performance. Use Direct query for Fact tables and use import for small dimension tables.

  For SQL and other databases

- Breaking down a complex query into smaller, more manageable parts reduces the computational load on Power BI, which leads to faster refresh and report generation
- When queries are segmented, it's easier to maintain and update the data models and in case of errors/performance issues, it is easier to find the problem in smaller/isolated query.
- By querying multiple tables separately, you load only the necessary data for each specific report rather than loading a comprehensive dataset.
- Different datasets might require various transformations. By breaking them down into smaller chunks, you can apply the most appropriate transformation to each query.
- Aggregating data at the SQL level can dramatically reduce the volume of data transferred and processed in Power BI. This is very crucial when dealing with large datasets.

Visualisations

1. Power BI Visualizations

- Power BI offers various general-purpose and specific visualizations.
- **General-purpose visuals:** Tables, matrices, card KPIs, and slicers.
- **Time series analysis**: Line chart or Area chart
- **Categorical data:** Best represented using bar, column, pie, and donut charts.
    - Bar/column chart - you can visualise in difference in magnitude
    - pie/donut chart - you can visualise the difference in proportion/percentage; Suitable for small number of categories (10)
- **Correlation analysis:** Use scatter plots and bubble charts.
- **Other visuals:** Histograms, waterfall charts (point to whole chart), and maps for specific insights.
- **Formatting:** Adjust font size, colours, and data labels to improve readability.
- **Conditional formatting:** Highlights key data dynamically.
- Report Settings, General and Visual settings in the Power BI

2. Slicing and Filtering

- **Slicers:** Allow interactive selection and filtering across all visuals on a report page.
- **Filters:** Managed in the filter pane with three levels:
    - **Visual-level filters** (apply to a single visual).
    - **Page-level filters** (apply to all visuals on a page).
    - **Report-level filters** (apply to all visuals in the report).
- Visualisation filter - Clicking one part of the report will change filters on other charts of the report.
- Lock in filters - Disables the modification of the filter by the user.

3. Exporting Data and Reports

- **Analyse in Excel:** Enables deeper analysis in Excel using Power BI datasets.
- **Paginated Reports:** Designed for print-friendly formats (PDF or paper), should be required when need to be used in tabular format
- Custom Apps in Power BI do not have the same visualisation settings as the Native Power BI app.

4. Enhancing Report Usability & Storytelling

- **Navigation & Interactivity:**
    - Use buttons and links for smooth navigation between pages.
    - The action property of the button can be used to navigate to a page, bookmark, drill through and the Q/A section of the report
    - **Bookmarks**: Capture report states for quick reference and presentations; Used to save the specific state of the report and also stores the visualisation visibility.

    - **Sorting**: Organize data in visuals for better trend identification; Sorting the Month name in chronological order will need to use another measure.
- **Visual Interactions:**
    - **Filter interaction:** Selection in one visual filters another.
    - **Highlight interaction:** Emphasizes selected data but keeps unselected data visible.
    - **None:** Disables interactions between visuals.
- **Syncing Slicers:** Apply a single slicer selection across multiple report pages.
- **Selection Pane:** Organizes and layers visuals for structured reports.

5. Mobile Optimization

- Use Mobile Layout View to adjust visuals for better readability on smaller screens.
- Any visualisation configuration in mobile layout does not affect the behaviour on the report layout view

6. Publishing the report

- When you publish the report, you publish certain components
    - Data Table and columns
    - Data Column and Schema design
    - Any reports and visualisations you created
    - All DAX measures created in the data model

7. Identifying Patterns & Trends

- **Detecting Anomalies & Outliers:** Use scatter charts to spot irregularities.
    - An anomaly is an error or unexpected event, while an Outlier is part of the data but is different from the scatter or group.
    - Anomaly detection uses an AI model to detect data points that deviate significantly from expected trends, highlighting anomalies with explanations and possible reasons
    - Anomaly detection is a feature that helps you spot unusual patterns in the dataset; it only works with time series data/measures
    - Anomaly detection only works withthe IMPORT storage type. It cannot work with Direct Query and
- **Grouping & Binning:**
    - Used to combine data rows based on the specific/categorical column values
    - **Grouping:** Consolidates similar data points into categories.
    - **Binning:** Segments numeric data into defined ranges.

8. AI-Powered Insights in Power BI

- **Key Influencers:** Identifies factors impacting outcomes; can also be used to identify the top segment
    - Can be used to identify which factors affect the metric being analysed.
    - Ranks and quantifies the impact of each influencing factor; Can analyse both categorical and numerical data
- **Decomposition Tree:** Breaks down complex metrics or measures into their underlying components for deeper analysis.
    - Helps in root cause analysis and understanding key drivers of the performance; Comparative analysis - How different categories impact KPIs
- **Forecasting:** Predicts future trends based on historical data.; only works with time series data or measures
    - Uses exponential smoothing to project future values; the User can adjust confidence levels and forecast length

9. Reference and Error Lines

- Reference Lines are created to reference a certain value in the dataset, and can be put on the charts to help understand chart based on that reference value
    - Can be created by using Average, Median, Percentile, Constant, Min/Max and Trend lines
- Error lines/bars - used to explain the variability and uncertainty in the data; Can be created using by field, by percentage, by percentile and by standard deviation

10. Scorecard and Metrics

A Scorecard is a group of metrics, tracking the progress of important data points. Can only be created in Power BI services

Deploy and Maintain Assets

1. Power BI Workspaces

- A workspace is a dedicated area that organizes datasets, reports, paginated reports and dashboards.
- You can have 1000 datasets per workspace
- **Benefits of workspaces:**
    - **Access control:** Only authorized users can view or edit.
    - **Collaboration:** Teams can work together efficiently.
    - **Quick updates:** Analysts can modify reports and data easily.
- **Workspace roles:**
    - **Viewer:** Can see content but cannot modify it and subscribe to alerts as well. Can he build the dashboard? - No, At least member level is required.

    - **Contributor:** Can add/edit content but not manage members. Least Privilege required to schedule the data refreshes; Modify Gateway settings; Can Publish, Unpublish, edit, and delete content, such as reports, in the workspace
    - **Member:** Can modify content and add new members. Publish, unpublish, and change permissions for an app; Cannot remove a member, only add a member to lower privileges; Least Privileges required to manage semantic model permissions
    - **Admin:** Has full control over workspace assets; Controls member access and can delete the workspace; Least Privileges required to update workspace metadata
- Power BI workspace apps can bundle related BI dashboards and reports into a single collection for easier sharing.
- **Dashboard Rules**

Some report formatting options or themes aren't applied to visuals when you pin them to a dashboard.

- Border, shadow, and background settings are ignored in the pinned tile.
- For card visuals, the text used for the value is shown in dashboards using the 'DIN' font family, with black text. You can change the text color for all the tiles on a dashboard by creating a custom dashboard theme.
- Conditional formatting isn't applied.
- Visuals will adjust their size to fit the size of the tile. This can result in differences in layout as if the visual had been resized on the report.

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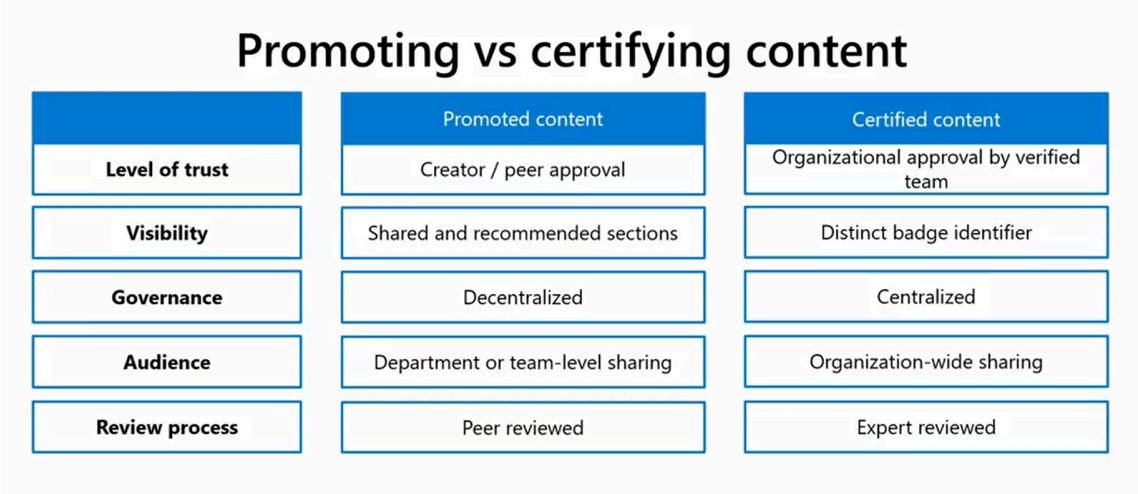
2. Publishing & Managing Assets

- **Publishing content:**
    - Import assets by uploading or publishing from Power BI Desktop.
    - Updates overwrite previously published reports and datasets.
- **Subscriptions & Alerts:**
    - Users receive automated notifications based on data changes.
    - Helps track important KPIs and anomalies.
    - Automatic report delivery, customised data views, and can have varying schedules
    - 24 Subscriptions Per Report
- **Promoting & Certifying Content:**
    - Helps **establish data trust & quality standards**.
    - Users can **identify accurate & validated reports** in Power BI Service.



- Promoting Content
  - Stamp of approval using organisation's standards
  - Content can be available to a wider audience
- Certifying content
  - Setting up a content policy with selected users
  - Review Process, Governance, Visibility and Trust
  - indicates that content has undergone a complex vetting process and aligns with the highest organizational standards

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3. Power BI Apps & Audience Management

- Workspaces allow the creation of Apps, which package content for easy sharing.
- Requires a Power BI Pro or Premium Per User (PPU) license.
- Multiple audience groups can be configured to control access to different user groups.

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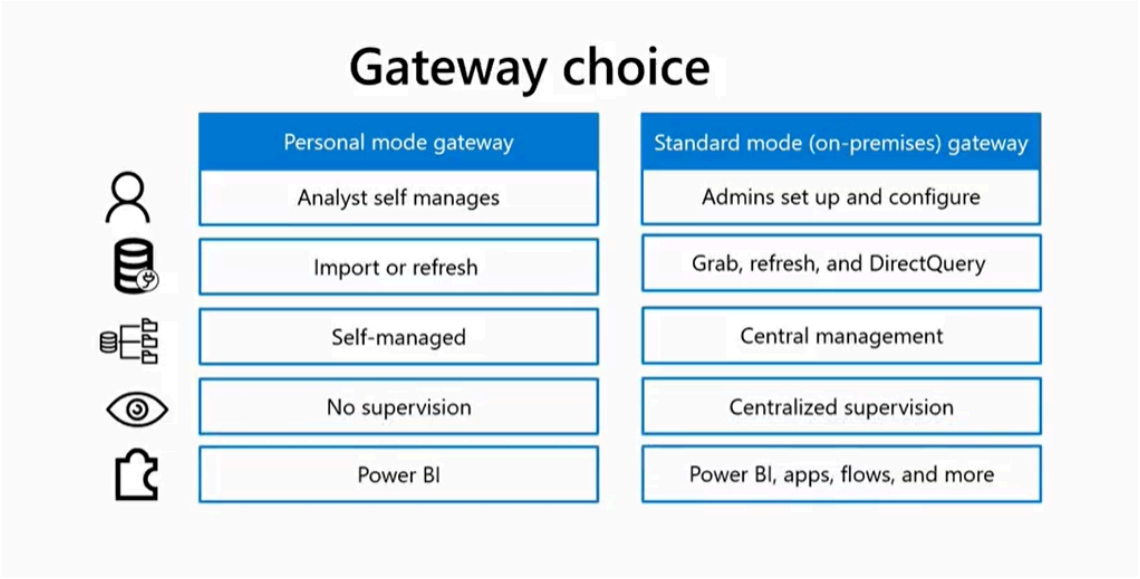
4. Data Gateway & Scheduled Refresh

- A Data Gateway connects the Power BI Service with on-premises data sources (SQL, Excel, etc.).
- Types of Data Gateways:
  - Personal Mode: For single users, limited use cases.
  - Standard Mode: Multi-user and multi-source support (best for organizations).
  - Virtual Network Gateway: Connects to cloud-based virtual networks without installation.
- **Schedule Refresh:** Ensures real-time data synchronization between Power BI Service & connected data sources.
- Premium has a limit of 48 refreshes per day

Step 6: Credentials settings

1. In the **Configure** popup, select **Windows without Impersonation** as the **Authentication method**
2. Then select **Organization** as the **Privacy level** setting for this data source.
3. Select **Sign In** and you are done with your gateway configuration.



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5. Row-Level Security (RLS)

- Restricts data access at the row level based on user roles.
- Enhances data security by ensuring users see only relevant information.
- Used in organizations to control data visibility by department, region, or role.

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6. Managing Permissions & Impact Analysis

- Permissions control who can access, edit, or share datasets & reports.
- Impact Analysis Tools:
  - Help identify dependencies between datasets, reports, and dashboards.
  - Ensure updates won't disrupt existing reports and workflows.

Important Points from the Questions

- Changes supported by the Data source settings in the Power Query interface
  - Clearing permission
  - Editing permission

- Modify file path

- To create a bookmark that toggles visibility of the visual
  - Disable data option
  - Disable the current page option
  - Enable the display option

Q You publish a dataset that contains data from an on-premises Microsoft SQL Server database.

The dataset must be refreshed daily.

You need to ensure that the Power BI service can connect to the database and refresh the dataset.

Which four actions should you perform in sequence? To answer, move the appropriate actions from the list of actions to the answer area and arrange them in the correct order.

A. Configure On-Premises Data Gateway>> Add Data Source>> Add the dataset owner as data source >> Configure daily refresh

- To connect to any NOSQL Database, an ODBC connector is used.
- The default timeout for the connection from the Desktop is 10 minutes

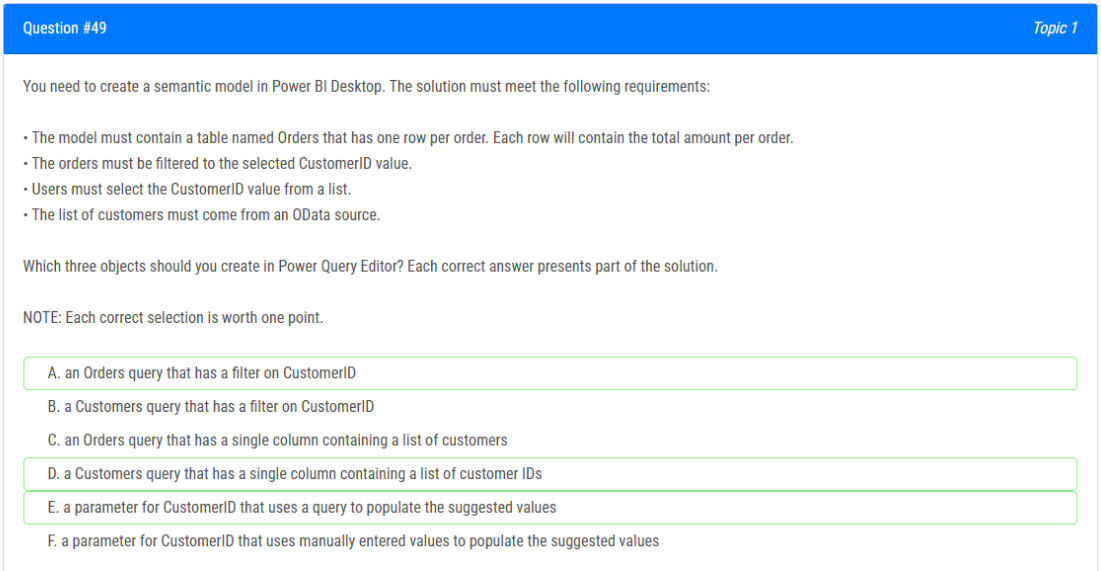
Q. From Power Query Editor, you attempt to execute a query and receive the following error message.

Datasource.Error: Could not find the file.

A. You do not have permission to the file.

The referenced file was moved to a new location

- Fuzzy matching is a technique that compares data to find approximate matches, even if there are differences in spelling or formatting. It's also known as approximate string matching, fuzzy name matching, or fuzzy string matching.



- When using DirectQuery to connect to a data source, you can select "Assume Referential Integrity" to enable more efficient queries. This feature has specific data requirements and is only available with DirectQuery connections.
- SAMEPERIODLASTYEAR → Gives you the data for the same period until when data is available for this period, Let's say we have data till Feb 2025, so the given function will give us the data from Jan 2024 and Feb 2024, while PREVIOUSYEAR gives us the data from the whole of 2024
- PARALLELPERIOD returns a table containing dates that parallel those in the specified dates column, shifted forward or backward by a specified number of intervals based on the current context.
    - Syntax: PARALLELPERIOD(<dates>,<number_of_intervals>,<interval>) dates: A column that contains dates. interval: The interval by which to shift the dates. The value for the interval can be one of the following: year, quarter, or month.
- Splitting the visuals on multiple pages improves the performance of the report when the report is too slow to load
- Fact tables store observations or events and can be sales orders, stock balances, exchange rates, temperatures, etc. A fact table contains dimension key columns that relate to dimension tables and numeric measure columns.
- Microsoft Information Protection sensitivity labels provide a simple way for users to classify critical content in Power BI without compromising productivity or the ability to collaborate. Sensitivity labels can be applied to datasets, reports, dashboards, and dataflows. When data is exported from Power BI to Excel, PowerPoint or PDF files, Power BI automatically applies a sensitivity label on the exported file and protects it according to the label's file encryption settings.
- In RLS, the Email is matched by the user name, and the Name is matched by the USERPRINCIPLENAME function
- Fields and Calculations are used to develop a quick measure in the Power BI desktop
- Filled Maps and Azure Maps are two map visuals which will allow us to create a geographical hierarchy on the report page
- Power BI does not allow you to set and manage alerts on the tile, taking data from the live streaming database
- You can set sensitive levels on Paginated Reports, Dataflows and Semantic models(datasets), reports and dashboards
- Types of sensitive labels - Personal, Public, General, Confidential, and Highly Confidential.

Question: 6 CertyIQ

Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.
You have a Power BI report that imports a date table and a sales table from an Azure SQL database data source. The sales table has the following date foreign keys:
- Due Date
- Order Date
- Delivery Date

You need to support the analysis of sales over time based on all the date foreign keys.
Solution: From Power Query Editor, you rename the date query as Due Date. You reference the Due Date query twice to make the queries for Order Date and
Delivery Date.
Does this meet the goal?

- ◯ Yes
- ◯ No

Question: 7 CertyIQ

You use Power BI Desktop to load data from a Microsoft SQL Server database.

While waiting for the data to load, you receive the following error.

```
ERROR [08001] timeout expired
```

You need to resolve the error.

What are two ways to achieve the goal? Each correct answer presents a complete solution.

NOTE: Each correct selection is worth one point.

- ☐ Reduce the number of rows and columns returned by each query. ✓
- ☑ Split log running queries into subsets of columns and use Power Query to merge the queries. ✓
- ☐ Use Power Query to combine log running queries into one query.
- ☑ Disable query folding on long running queries. ✗

Explanation:
A. Reduce the number of rows and columns returned by each query.
B. Split log running queries into subsets of columns and use Power Query to merge the queries.

A. Reduce the number of rows and columns returned by each query.
Limiting the amount of data returned by the queries decreases the load on the Power BI engine and reduces the likelihood of memory or performance-related issues.
Filtering the data at the source can optimize query execution and minimize processing time.
B. Split long-running queries into subsets of columns and use Power Query to merge the queries.
Dividing large or complex queries into smaller, manageable pieces reduces the strain on the system.
Power Query can be used to combine these subsets later, allowing the system to process the data in chunks rather than a single large operation.

Why the Other Options Are Incorrect:
C. Use Power Query to combine long-running queries into one query.
Combining queries into a single query increases complexity and processing load, which can exacerbate performance issues.
D. Disable query folding on long-running queries.
Query folding allows Power BI to push transformations back to the database server, which is more efficient. Disabling query folding can result in increased data transfer and slower performance.

Explanation:
The goal is to address the root cause of the error — likely caused by large datasets or complex queries — and ensure efficient data processing in Power BI. By reducing data size (A) and breaking queries into smaller subsets (B), the error can be resolved effectively.

Question: 1 CertyIQ

You are creating a report in Power BI Desktop.
You load a data extract that includes a free text field named coll.
You need to analyze the frequency distribution of the string lengths in col1. The solution must not affect the size of the model.
What should you do?

- ○ In the report, add a DAX calculated column that calculates the length of col1
- ○ In the report, add a DAX function that calculates the average length of col1
- ◉ From Power Query Editor, add a column that calculates the length of col1 ✗
- ○ From Power Query Editor, change the distribution for the Column profile to group by length for col1 ✓

Explanation:
A will affect the size of the model as would C.
B doesn't give you enough information about the distribution (just the average)
D is the right answer.
1. Power Query Editor -> View -> Enable Column Profile
2. Select three dots (top left corner) in the profile pane appear at the bottom of the Query Editor window.
3. Group By -> Text length

Using Column Profiling in Power Query Editor allows you to analyze the frequency distribution of string lengths in col1 without adding new columns or increasing the size of the model. This meets the requirements efficiently, as the analysis is performed in-memory and not persisted in the model.

Question: 10 CertyIQ

Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.
You have five reports and two dashboards in a workspace.
You need to grant all organizational users read access to one dashboard and three reports.
Solution: You create an Azure Active Directory group that contains all the users. You share each selected report and the one dashboard to the group.
Does this meet the goal?

- ○ Yes ✓
- ◉ No ✗

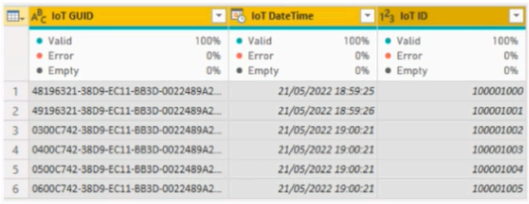
Explanation:
Yes, from the documentation a suggestion made there to share with more than 100 separate users is to "Share with a user group that contains all the

Question: 6 CertyIQ

Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.

After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.

From Power Query Editor, you profile the data shown in the following exhibit.



	IoT GUID	IoT DateTime	IoT ID
	Valid 100% Error 0% Empty 0%	Valid 100% Error 0% Empty 0%	Valid 100% Error 0% Empty 0%
1	48196321-38D9-EC11-BB3D-0022489A2...	21/05/2022 18:59:25	100001000
2	49196321-38D9-EC11-BB3D-0022489A2...	21/05/2022 18:59:26	100001001
3	0300C742-38D9-EC11-BB3D-0022489A2...	21/05/2022 19:00:21	100001002
4	0400C742-38D9-EC11-BB3D-0022489A2...	21/05/2022 19:00:21	100001003
5	0500C742-38D9-EC11-BB3D-0022489A2...	21/05/2022 19:00:21	100001004
6	0600C742-38D9-EC11-BB3D-0022489A2...	21/05/2022 19:00:21	100001005

The IoT GUID and IoT ID columns are unique to each row in the query.

You need to analyze IoT events by the hour and day of the year. The solution must improve dataset performance.

Solution: You split the IoT DateTime column into a column named Date and a column named Time.

Does this meet the goal?

- ○ Yes ✓
- ◉ No ✗

Explanation:
The correct answer is A. Splitting datetime column will improve the performance even if it generates one more column, having less unique values in separated date and time columns will achieve better compression.

Question: 8 CertyIQ

Note: This question is part of a series of questions that present the same scenario. Each question in the series contains a unique solution that might meet the stated goals. Some question sets might have more than one correct solution, while others might not have a correct solution.
After you answer a question in this section, you will NOT be able to return to it. As a result, these questions will not appear in the review screen.
You have a clustered bar chart that contains a measure named Salary as the value and a field named Employee as the axis. Salary is present in the data as a numerical amount representing US dollars.
You need to create a reference line to show which employees are above the median salary.
Solution: You create an average line by using the Salary measure.
Does this meet the goal?

- ◉ Yes ✗
- ○ No ✓

Explanation:
Average is not Median.
Instead: You create a percentile line by using the Salary measure and set the percentile to 50%.
The median is the middle value or the 50th percentile of a data set.

Reference:
https://dash-intel.com/powerbi/statistical_functions_median.php

15. You have a Power BI project containing two data tables. The tables are related via many-to-many relationships. How many possible cross-filter directions could exist between the tables? 1 point

- ○ 4
- ○ 2
- ◉ 3
- ○ 1

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17. You imported a data model to Power BI. The mode does not have a date dimension table that is needed to create complex time intelligence calculations. Which of the following tools can you use to create a date dimension table? Select all that apply: 1 point

- ☑ DAX in the Power BI desktop.
- ☑ M language in the query editor.
- ☐ DAX in the query editor.
- ☑ Python
- ☐ SQL

20. Which of the following statements about **Measures** in Power BI is true? Select all that apply.

- ☑ Measures can reference other measures during calculations.
- ☐ **Measures** can reference columns directly.
- ☑ Measures are dynamic calculations that do not take space in the data model
- ☐ Measures can only be created using DAX in Power BI.

26. You need to create aggregations to improve model performance of a **DirectQuery** sourced dataset in Power BI. Which Power BI component allows you to create aggregations? 1 point

- ○ Power BI desktop report view
- ○ Power BI desktop model view
- ◉ Power query editor
- ○ Power BI desktop table view

25. True or False: You have imported a data model to Power BI desktop. You need to create a number of time intelligence calculations using DAX. The data model does not have a dedicated date table. To create the time intelligence measures, the first step is to create a common date table within your data model. 1 point

- ○ True
- ◉ False

35. How is drill-through different from drill-down functionality in Power BI? 1 point

- ◉ Drill-through provides a more detailed view while drill-down is used to expand hierarchies.
- ○ A drill down and drill through can be used interchangeably.
- ○ Drill-through is used to expand hierarchies while drill-down provides detailed navigation.
- ○ A drill-down is used for visuals, while a drill-through is used for tabular data.

36. You have a Power BI desktop report containing three pages: **Main**, **Delayed Response**, and **On-time Response**. You have added a **Button** to the **Main** page for navigation. 1 point

You need to implement a solution that meets the following criteria:

- The navigation destination must change based on the output of a DAX measure name [Delayed Response].
- If [Delayed Response] is greater than 5%, the **Button** must display the text "Delayed Response" and navigate to the **Delayed Response** page.
- Otherwise, the **Button** displays the text "On-time Response" and navigates to the **On-time Response** page.

What actions should you perform? Select all that apply.

- ☑ Create a DAX measure that outputs the correct page name based on the value of [Delayed response].
- ☐ Set the button type to **Bookmark** and then use **Conditional formatting** to specify the destination.
- ☑ Set the **Button** type to page navigation and then use **Conditional formatting** to specify the destination.
- ☑ Use **Conditional formatting** to set the **Button** text.

37. You have a Power BI dataset where each employee is reporting to multiple managers in the organizational hierarchy. How does a **PATH** function of DAX handle such a situation? 1 point

- ○ The **PATH** function cannot handle multiple reporting relationships.
- ○ It concatenates all paths for each manager.
- ◉ It creates a separate path for each employee-manager relationship.
- ○ It chooses the shortest path for each employee.

42. In Power BI where can you find time series charts? 1 point

- ○ In the **Filter pane** of Power BI Desktop.
- ○ Time series charts are in the **Visualizations** pane.
- ◉ You need to import time series charts from AppSource.
- ○ The **Fields pane** contains the time series charts.

44. Which of the following features are not supported in Power BI dashboards? Select all that apply. 1 point

- ☑ Creation of multiple pages
- ☐ Natural language queries
- ☐ Setup of data Alerts
- ☑ Use of slicers and filters

45. Which content type can be endorsed in Power BI? Select all that apply. 1 point

- ☑ Semantic model
- ☐ Excel workbook
- ☐ Live streaming dataset
- ☑ Dataflows
- ☑ Reports

46. True or False: You can only subscribe to external users to a Power BI report or dashboard if your report or dashboard is hosted in a Premium capacity. 1 point

- ◉ True
- ○ False

48. Your company has a SharePoint server located in a data center in Toronto. You are creating a report in Power BI service that uses Microsoft Excel files stored on the SharePoint server. You need to recommend a solution to ensure that the dataset for the report can automatically refresh daily. What should you include in the recommendation? 1 point

- ○ Azure Data box
- ◉ An on-premises data gateway
- ○ A virtual private network (VPN)

49. You have a Power BI data model that imports data from an on-premises SQL Server. You have implemented a scheduled refresh of the dataset. What happens to the Power BI report after each scheduled refresh? Select all that apply. 1 point

- ☐ Query caches are refreshed
- ☑ Schema refresh that is change in data source table structure is shown
- ☑ Queries used to populate visuals are refreshed
- ☑ Data is refreshed from the data source
- ☐ Report visuals are refreshed

50. You are applying sensitivity labels to your Power BI reports, which of the following are sensitivity labels in Power BI? Select all that apply. 1 point

- ☑ **Confidential**
- ☑ **Personal**
- ☑ **Highly confidential**
- ☐ **Certified**

8. You have a Power BI model with the following fact tables and corresponding storage modes: 1 / 1 point

- **FactStoreSales** (**Import** mode)
- **FactInternetSales** (**DirectQuery** mode)

The model contains a dimension table named **DimDate** that has a relationship to both fact tables of the data model. To combine data from the dimension table and the fact tables by minimizing the query execution time, which storage mode should you choose for the **DimDate** dimension table?

- ○ **Import**
- ◉ **Dual**
- ○ None
- ○ **DirectQuery**

10. You have an HR Power BI data model containing a fact table with information about employee performance reviews and dimension tables for employees and departments. What type of data is likely stored in the dimension tables? 1 / 1 point

- ○ Aggregated metric for employee performance
- ○ Transactional data about employees
- ○ Detailed performance review data
- ◉ Descriptive information about employees and departments

Correct
That's correct! The dimension tables store descriptive information about employees and departments, providing context to the performance review data in the fact table.

13. Which Power BI component allows you to create and manage dataflows? 1 / 1 point

- ○ Power query from Power BI desktop
- ◉ Power BI Service
- ○ Power BI data modeler
- ○ Power BI desktop interface

Correct
That's correct! You can only create and manage dataflows in the Power BI service and use them from Power BI desktop.

14. You have a Power BI project with a large dataset. You have applied an extensive set of transformation operations to the dataset for analysis and visualization. You need to duplicate the data table for some additional analytical tasks. What transformation can you do to avoid repeating the transformation steps you already performed on the query? 1 / 1 point

- ○ Duplicate query from the query editor.
- ◉ Reference query from the query editor
- ○ Duplicate and save Power BI file with a different name.
- ○ Duplicate the data model.

Correct
In reference query you can use an existing query in another query. All changes made to the primary query are automatically applied to the referenced query ensuring data consistency and avoiding the repetition of data transformation steps.

20. Which of the following statements about **Measures** in Power BI is true? Select all that apply. 1 / 1 point

- [x] Measures can reference other measures during calculations.

Correct
That's correct! You can reference previously computed measures to calculate the new measures.

- [ ] **Measures** can reference columns directly.
- [x] Measures are dynamic calculations that do not take space in the data model

Correct
That's correct! Unlike **Calculated columns**, measures do not take up space and compute the value on the fly.

- [ ] Measures can only be created using DAX in Power BI.

33. When might you choose to use a Paginated report over an interactive report in Power BI? 1 / 1 point

- ( ) When designing for mobile devices.
- ( ) For ad-hoc queries.
- ( ) For real-time data analysis.
- (•) When you need to print the report in tabular format

Correct
That's correct! The major advantage of paginated reports is you can print all the data in a table, no matter how long it is.

9. You want to add a new column to the Power BI table that categorizes customers as high value if their total sales are above $10,000. Which transformation in the query editor allows you to create such a column without using the DAX expression?

- Custom column **(CORRECT)**
- Conditional split
- Group by
- Extract

That's correct! In the query editor, you can add a custom column and define the conditions for the column based on the sales values for each customer.

14. Which statement is true about reference queries in Power BI?

- Reference queries enable faster data load.
- Reference queries allow you to integrate data efficiently.
- Reference queries allow you to combine tables with similar structures.
- Reference queries allow you to reuse query logic and transformation. **(CORRECT)**

That's correct! In reference query you can use an existing query in another query. All changes made to the primary query are automatically applied to the referenced query ensuring data consistency and avoiding the repetition of data transformation steps.

17. You want to create a date table starting from May 31, 2021, and ending one year later. What M code will you use to create this table?

- =List.Dates(#date(2021,05,31), 365, #duration(1,0,1,0))
- =List.Dates(#date(2021,05,31), 365, #duration(0,0,0,1))
- =List.Dates(#date(2021,05,31), 1, #duration(1,0,0,0))
- =List.Dates(#date(2021,05,31), 365, #duration(1,0,0,0)) **(CORRECT)**

That's correct! The #date designates the starting date, 365 designates the duration and #duration(1,0,0,0) designates the duration interval in days. Therefore, the formula results in listing days starting on May 31, 2021 and ending 365 days later.

18. In the model view of Power BI desktop, what are the categories to configure column properties?

- General and Advanced.
- Formatting and Advanced.
- General, Formatting, and Advanced. **(CORRECT)**
- General and Formatting.

That's correct! In the model view of Power BI desktop, you can format and configure column properties based on three broad categories that are General, Formatting, and Advanced.

24. You are working on a Power BI data model that contains three data tables. A Salestable containing sales transactions, a Date table, and a Producttable.You want to create a summary table to display the following:

- The total sales by each product category per year.
- Total quantity of each product within the category.

You have created the following DAX measure:

```
Annual Sales Summary =

ADDCOLUMNS (

SUMMARIZE ( Sales, Date.[Year], 'Product'[Category] ),

"Total Quantity", SUM ( Sales[Quantity] ) )

)
```

Which of the following DAX functions you should include in the DAX expression to compute accurate results?

- CALCULATE **(CORRECT)**
- FILTER
- TOPN
- CALCULATETABLE

That's correct! You need to add CALCULATE before SUM to compute accurate results. Remember CALCULATE alters the filter context of the DAX calculations.

Calculating ensures the measure is correctly computed, total within the grouped context

27. You are working on an on-premises SQL Server dataset to develop a real-time analytical solution. In addition to providing real-time analysis, you need to optimize the query performance. What actions should you take to optimize the query performance? Select all that apply.

- Create aggregations based on DirectQuerysourced tables. **(CORRECT)**
- Query the original data source for all analytical requirements
- Connect Power BI via DirectQuery mode. **(CORRECT)**
- Import the data to Power BI memory.Reduce the data volume by importing only necessary columns. **(CORRECT)**

That's correct! Aggregations on the DirectQuerysourced tables improve the performance and efficiency of query.

That's correct! Creating DirectQuery connection allows you to access real-time data from SQL Server.

That's correct! Reducing the data by importing only the columns needed for analysis will reduce the model size thereby improving the query performance.

50. Which of the following security groups cannot add to row-level security in Power BI?

- Mail-enabled group
- Azure Active Directory Security Group
- Microsoft 365 Group **(CORRECT)**
- Distribution group

That's correct! Microsoft 365 groups are not supported and cannot be added to any roles in row-level security.

64. You have developed a Power BI report for the sales team of your company. The salespeople are frequently interacting with the report and complain that the report elements are taking too long to display upon each interaction. You have recorded the report performance from the performance analyzer. How do the results assist you in improving the report's performance?

- The results recommend reducing the data size.
- The results suggest you replace the visual elements.
- The results show you the impact of user interaction on report elements so you can optimize. **(CORRECT)**
- The results recommend the data fresh frequency.

That's correct! The Performance analyzer captures the impact of user interaction with the report elements which helps you identify the issues and optimize accordingly.

74. You manage a Power BI workspace. You need to delegate the task to schedule data refreshes. The solution must use the principle of least privilege. Which role should you use?

- Member
- Viewer
- Contributor **(CORRECT)**
- Admin

That's correct! The Contributor role is the least privileged role that grants permission to schedule data refreshes.

76. You want to create Alerts to notify users if the data on the dashboard changes above or below a certain threshold. Which Power BI visual allows you to set and manage Alerts in Power BI service? Select all that apply:

- Custom visuals
- KPI **(CORRECT)**
- Gauge **(CORRECT)**
- Card visual **(CORRECT)**
- Python visual

That's correct! Power BI service also allows you to set and manage Alerts in KPI, a visual used to track performance against a predefined target.

That's correct! You can set up and manage Alerts in the Gauge visual, within the Power BI service.

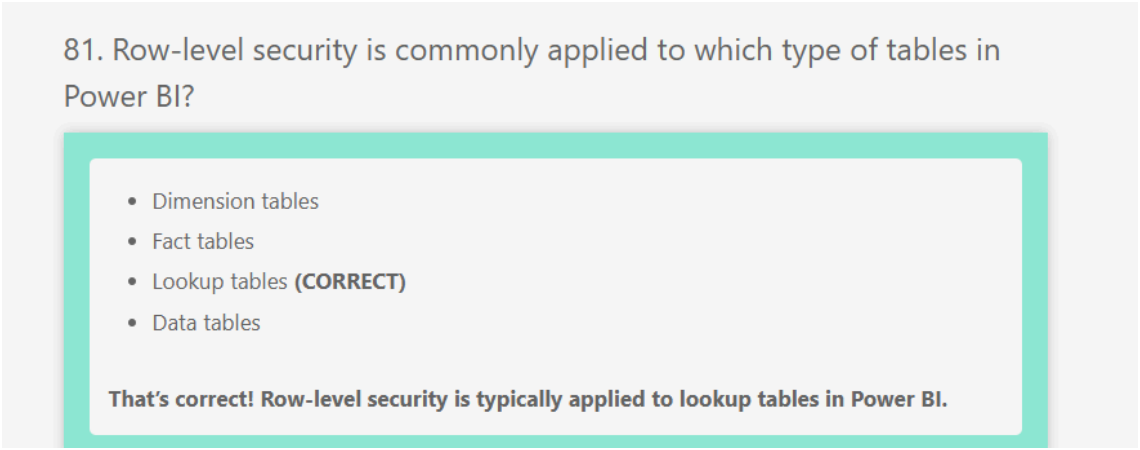
That's correct! The Card visual is the third visual element where you can set and manage Alerts within the Power BI service.

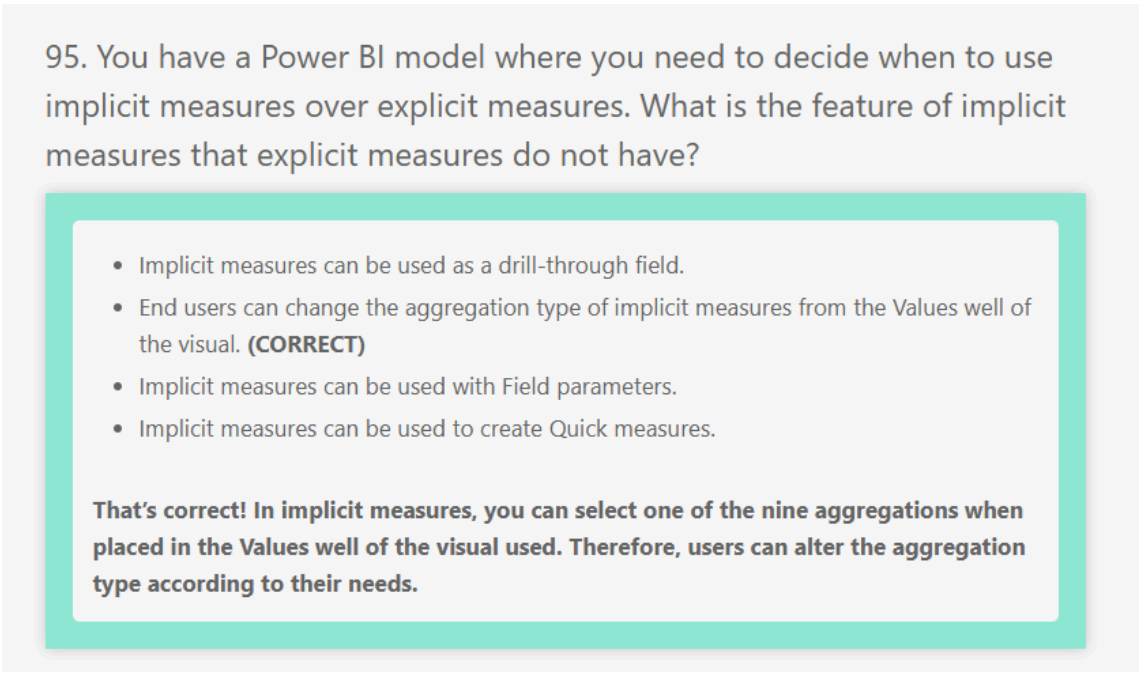
79. Your company has a SharePoint server located in a data center in Toronto. You are creating a report in Power BI service that uses Microsoft Excel files stored on the SharePoint server. You need to recommend a solution to ensure that the dataset for the report can automatically refresh daily. What should you include in the recommendation?

- Azure Data box
- A virtual private network (VPN)
- An on-premises data gateway **(CORRECT)**

That's correct! With an on-premises data gateway installed on your local machine, you can achieve daily refresh of the data regardless of where the data is hosted.

If your Excel files are stored in SharePoint Online (SharePoint in Microsoft 365), you do not need an On-Premises Data Gateway. Power BI can directly connect using the SharePoint Online connector with scheduled refresh. **BUT i**f your SharePoint server is on-premises (hosted in your company's data center, like in Toronto), Power BI cannot directly access it from the cloud. The On-Premises Data Gateway acts as a secure bridge between Power BI Service and your internal SharePoint server.





97. True or False: You cannot create quick measures in Power BI service because only Power BI desktop supports the creation of quick measures.

- True **(CORRECT)**
- False

That's correct! Power BI service does not support the creation of quick measures. You need to go back to Power BI desktop to create a quick measure for your analysis.

101. Power BI desktop supports many accessibility tools. Which keyboard keys let you access the accessibility features?

- Tab
- Alt + A
- Alt **(CORRECT)**
- Tab + A

That's correct! The Alt key displays the Keytips over each command in the current view of the Ribbon with a letter displayed on each tab which lets you navigate various tools via accessibility.

103. How can you group layers of visual elements in your Power BI desktop report? Select all that apply.

- Select all visuals to be grouped, navigate to the Format ribbon, and select Group. **(CORRECT)**
- Drag and drop the visual elements.
- Select all visuals to be grouped, right-click on any visual, and select Group from the context menu. **(CORRECT)**
- Right-click on any visual and select Group from the context menu

That's correct! You can also navigate to the Format ribbon and select Groupafter selecting the multiple visuals from the report canvas.

That's correct! You need to select multiple visuals to be grouped by holding the Ctrl key and selecting Group from the context menu.

115. What are the potential performance benefits of removing unnecessary columns from the data model? Select all that apply.

- Increasing the refresh speed. **(CORRECT)**
- Increasing DAX performance.
- Decreasing report page load times.
- Reducing the size of data model. **(CORRECT)**

That's correct! Fewer columns mean reducing the data model size and it takes less time to refresh the model.

That's correct! Fewer columns mean there is less data to import therefore reducing the model size.

119. What features can you configure in the Q&A feature of Power BI desktop? Select all that apply.

- Review Questions **(CORRECT)**
- Synonyms **(CORRECT)**
- Visual formatting
- ModelingRelationships **(CORRECT)**

That's correct! You can review the questions users have asked about your data and you can fix the misunderstanding for better user experience.

That's correct! You can add synonyms for the fields present in your datasets to let Power BI Q&A understand various terms users can use to ask questions.

That's correct! You can also define relationships between tables and fields to help Q&A understand questions about your data.

120. Anomaly detection is a powerful feature of Power BI where you can detect anomalies within your time series data. Which of the following features are not supported by anomaly detection? Select all that apply.

- You cannot use drill down with anomaly detection. **(CORRECT)**
- DirectQuery connectivity is not supported. **(CORRECT)**
- Line charts are not supported.
- Live connection to the dataset is not supported. **(CORRECT)**

That's correct! Drilling down to the granular level of details with a hierarchical structure is also not supported in anomaly detection.

That's correct! You cannot use anomaly detection if the Power BI model is connected to a DirectQuery – sourced dataset.

That's correct! Power BI's anomaly detection feature does not support Live connection to the dataset.

121. True or False: Only Power BI administrators can promote content in Power BI service.

- True
- False **(CORRECT)**

That's correct! Any content owner or user with the Write permission can promote the content in Power BI Service.

127. You have created a data model in Power BI desktop that contains DAX-calculated columns and measures. You want to create a report from the model. Where can you use DAX-calculated columns, without being able to use measures? Select all that apply.

- As an item in the Fields well of a slicer. **(CORRECT)**
- As a filter in the Filters on this Page well of the Filters pane. **(CORRECT)**
- As an item in the Add drill-through fields here well of the Visualizationpane.
- As a filter in the Filters on this visual well of the Filters pane.

That's correct! Unlike measures, calculated columns can be used in the slicer to place filter options on the report page.

That's correct! DAX measures cannot be placed in the Filters on this page well of the report.

131. You have created a Bookmark for your Power BI report. After creating a Bookmark, you added a new page to your report and reordered the pages. What should you do to update the Bookmark?

- You don't need any formatting because any additional page and reorder of pages automatically synced with the Bookmark. **(CORRECT)**
- You need to update the order of buttons in Bookmark, but the new page was automatically added to Bookmark.
- Navigate to the format Bookmark and update the settings.
- You need to add the new page to the Bookmark manually, but the order of pages automatically syncs with the Bookmark.

133. The Analyze in Excel feature allows you to summarize data in Excel with a live connection. What is the maximum row limit of summarized data with a live connection?

- You cannot analyze data in Excel as summarization with a live connection.
- Five hundred thousand **(CORRECT)**
- The same as the source dataset.
- Three hundred thousand

That's correct! Power BI allows you to analyze in Excel with summarization for a maximum of five hundred thousand rows.

136. Which of the following DAX functions can be used as filter modification functions within CALCULATE? Select all that apply.

- CROSSFILTER **(CORRECT)**
- FILTERS
- KEEPFILTERS **(CORRECT)**
- EARLIERUSERRELATIONSHIP **(CORRECT)**

That's correct! This function modifies the filter direction and can also be used to disable the filter direction between the tables. You must use this function within CALCULATE.

That's correct! KEEPFILTERS adds a filter without removing the existing filter when used within CALCULATE.

That's correct! This function engages the inactive relationship between the two related tables of the data mode and must be used within the CALCULATE function when defining a DAX measure.

139. You are setting a data gateway for your organization, and you need to decide between a personal and enterprise gateway. What factors influence your decision?

- Both gateways provide the same features
- The physical location of the data centers
- The type of data sources, for example, SQL and SharePoint
- The number of users and the need for centralized management **(CORRECT)**

That's correct! The enterprise data gateway supports multi-user scenario and is useful for centralized management therefore personal data gateway should not be opted.

140. Which Power BI refresh options require you to set parameters?

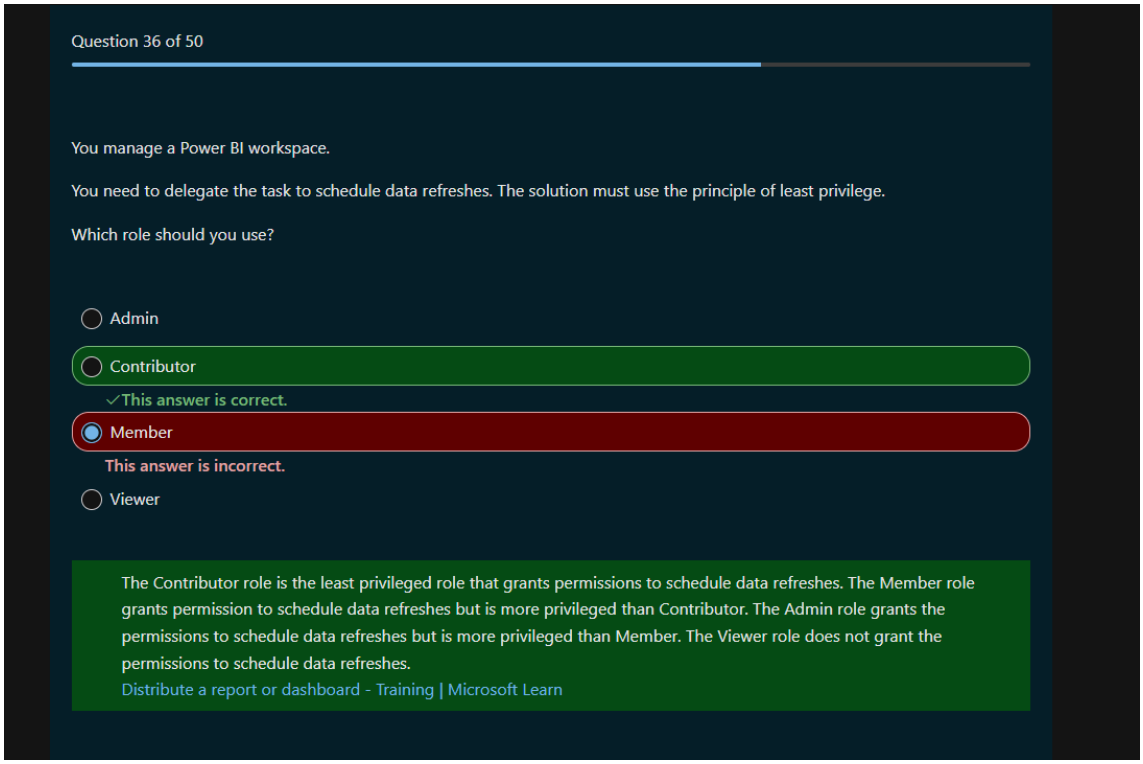
- Incremental refresh **(CORRECT)**
- On-demand refresh
- Scheduled refresh

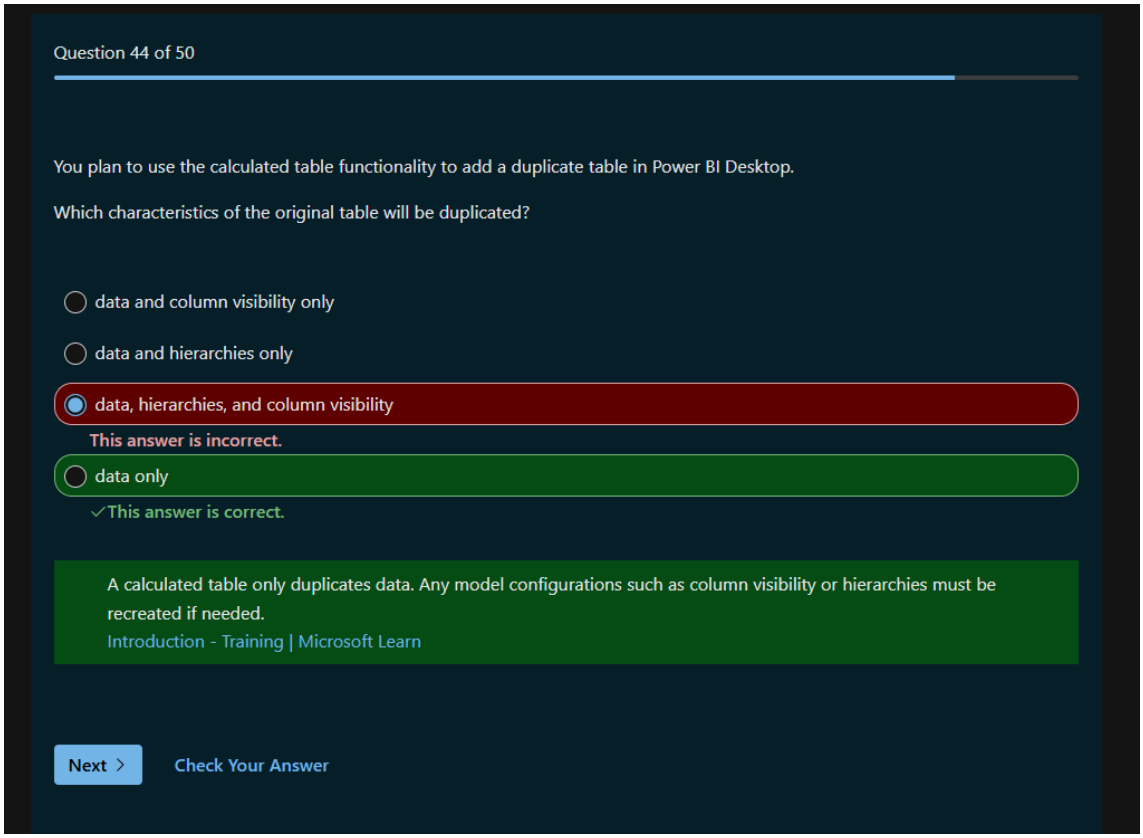
That's correct! In incremental refresh you need to ensure the dataset is partially refreshed according to the parameters you must define.

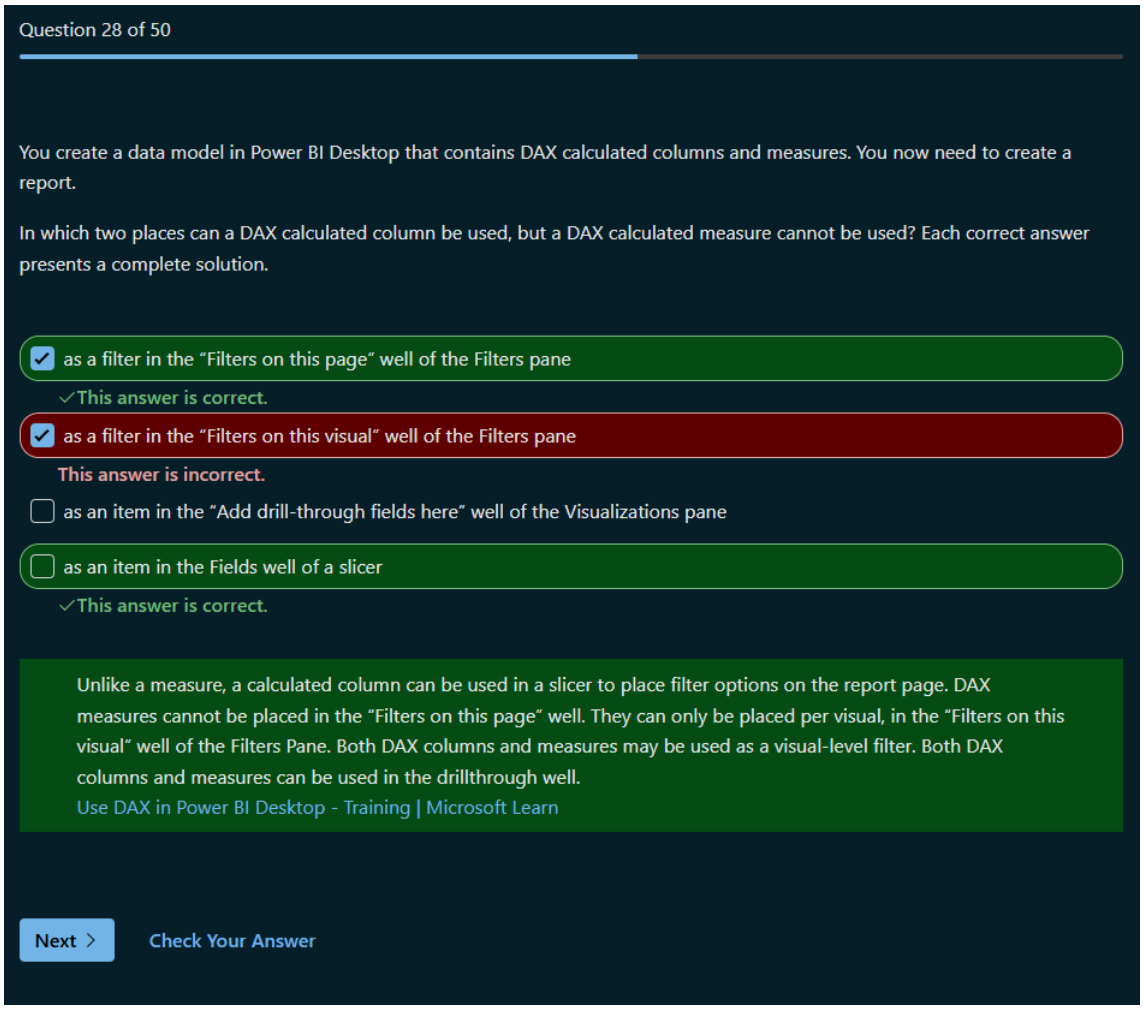
141. You need to create a data source that external users can access. Which type of data source should you use?

- Common data services **(CORRECT)**
- OneDrive
- SharePoint
- SQL Server

That's correct! Common data services allow users to securely store and manage data from various sources, including Office 365 and custom applications. It is a suitable option for creating data sources that external users can access because it provides a secure and scalable platform for managing data.




Question 44 of 50
You plan to use the calculated table functionality to add a duplicate table in Power BI Desktop.
Which characteristics of the original table will be duplicated?
data and column visibility only
data and hierarchies only
data, hierarchies, and column visibility
This answer is incorrect.
data only
✓This answer is correct.
A calculated table only duplicates data. Any model configurations such as column visibility or hierarchies must be recreated if needed.
Introduction - Training | Microsoft Learn
Next >
Check Your Answer



Data Import Errors and Possible Solutions

1. Query timeout expired - This error indicates that you've pulled too much data according to your organization's policies
    a. Reduce the number of columns and rows from the data by using where columns (if part of the data is needed) - you can combine half the columns in one query and the other half in a different query. Power Query can merge those two queries back together after you're finished.
    b. Reduce the complexity of the query by breaking query into smaller queries and merging those queries in Power BI
    c. Use aggregation functions like group by or sum to get the data (if possible)
2. File not found exception
    a. This error is caused by the file moving locations or the permissions to the file changing. If the cause is the former, you need to find the file and change the source settings.
3. Data Type error - Sometimes, when you import data into Power BI, the columns appear blank. This situation happens because of an error in interpreting the data type in Power BI.

a. The resolution to this error is unique to the data source. For instance, if you're importing data from SQL Server and see blank columns, you could try to convert to the correct data type in the query.

Instead of using this query: `SELECT CustomerPostalCode FROM Sales.Customers`

Use this query: `SELECT CAST(CustomerPostalCode as varchar(10)) FROM Sales.Customers`

By specifying the correct type at the data source, you eliminate many of these common data source errors.

Extras

- Data descriptive in nature, therefore should be stored in the dimension table that will provide context for the fact table of the data model.
- **Key Difference Between "Last Month" and "Previous Month":**
  - **Last Month**: Refers to the last **30 or 31 days** from the most recent date in your data.
  - **Previous Month**: Refers to the **entire prior calendar month**, regardless of the current date (e.g., from February 1 to February 28 or 29, if it is a leap year).
- Fuzzy merge is a smart data preparation feature you can use to apply fuzzy matching algorithms when comparing columns. These algorithms try to find matches across the tables that are being merged.

Optimize the Data Model in Power BI

- **Choose the right data model:**
  - **Star Schema:** For most scenarios, a star schema with a central fact table connected to dimension tables is the most efficient design for fast queries.
- **Data Cleaning and Reduction:**
  - **Import only necessary data:** Avoid bringing in unnecessary columns or rows from your source data.
  - **Optimize data types:** Ensure each column has the correct data type to minimize storage size and improve query performance.
  - **Remove redundant data:** Identify and remove duplicate or unnecessary information.
- **DAX Calculations:**
  - **Use measures instead of calculated columns:** Calculated columns create new data for every row, while measures are calculated on demand, improving performance for large datasets.
  - **Efficient DAX formulas:** Write clean and optimized DAX formulas, avoiding unnecessary iterations and complex calculations.
- **Relationship Management:**
  - **Correct relationships:** Double-check that relationships between tables are accurately defined and properly set up.

    - **Manage cardinality:** Be mindful of columns with high cardinality (many unique values) as they can impact performance.
- **Data Storage Mode:**
    - **DirectQuery vs. Import:**
        - **DirectQuery:** Suitable for large datasets where you want to query directly from the source database, but can be slower for complex calculations.
        - **Import:** This is Better for smaller datasets where you need to perform data transformations and aggregations within Power BI.
- **Performance Optimization Techniques:**
    - **Aggregations:** Pre-aggregate data where appropriate to improve query speed, especially for large datasets.
    - **Partitioning:** Dividing data into smaller partitions for faster filtering and analysis
    - **Performance Analyzer:** Utilize the built-in Power BI tool to identify performance bottlenecks and optimize queries.
- **Other Considerations:**
    - **Disable Auto Date/Time:** This feature can automatically create unnecessary date tables.
    - **Keep Power BI Desktop updated:** Regularly update to benefit from performance improvements and new features.
- Pivot and unpivot
- When to use Fact and Dim tables
- Breadcrumbs and Other visuals to avoid
- You can’t have alerts on Teams, and report only notification centre and email can receive alerts

https://learn.microsoft.com/en-us/power-bi/collaborate-share/service-roles-new-workspaces