

**1. What is a primary key in a table?**

A primary key is a column (or set of columns) in a table that uniquely identifies each row. No two rows can have the same primary key value, and it cannot contain NULL values.

**2. Name the two types of table relationships in Power BI.**

The two main types are: - One-to-Many (1:\*) : The most common type where one record in a table relates to many records in another. - Many-to-Many (\*:\*) : Where multiple records in one table can relate to multiple records in another.

**3. How do you create a relationship between two tables in Power BI?**

Go to 'Model' view → Drag a field from one table to the matching field in another table → Choose the relationship type and cardinality.

**4. What is a 'star schema'?**

A star schema is a data model where a central fact table is connected to multiple dimension tables, forming a star-like structure. It is optimized for querying and reporting.

**5. Which table is typically the fact table in a sales dataset?**

In a sales dataset, the Sales table is typically the fact table because it contains measurable metrics such as Quantity, Revenue, and links to dimension tables like Products and Customers.

**6. Link Sales.csv to Customers.csv using CustomerID (one-to-many).**

In Power BI Model view: Drag CustomerID from Customers to CustomerID in Sales. Set cardinality to One-to-Many (1:\*), with Customers as the 'One' side and Sales as the 'Many' side.

**7. Why is ProductID in Sales.csv a foreign key?**

Because ProductID in Sales refers to the ProductID in the Products table, linking each sale to its product details.

**8. Fix a relationship error where ProductID has mismatched data types.**

Ensure both columns have the same data type in Power Query or Data view. For example, change both to Whole Number or Text.

**9. Explain why a star schema improves performance.**

Star schemas reduce the number of joins needed for queries, simplify relationships, and allow Power BI's VertiPaq engine to compress data efficiently.

**10. Add a new column TotalSales in Sales (Quantity \* Price from Products).**

In Sales table (DAX):  $\text{TotalSales} = \text{Sales[Quantity]} * \text{RELATED(Products[Price])}$

**11. Optimize a model with circular relationships—how would you resolve it?**

Break the circular dependency by removing one relationship or changing it to single-direction filtering. Consider creating a bridge table.

**12. Create a role-playing dimension for OrderDate and ShipDate.**

Duplicate the Calendar table to create separate tables for OrderDate and ShipDate. Link each to the corresponding date field in Sales.

**13. Handle a many-to-many relationship between Customers and Products.**

Create a bridge table (e.g., CustomerProduct) containing unique CustomerID-ProductID pairs, and link both Customers and Products to it.

**14. Use bidirectional filtering sparingly—when is it appropriate?**

When you need filtering to flow both ways, such as in many-to-many relationships or certain calculation scenarios. Use it carefully as it can affect performance and cause ambiguous results.

**15. Write DAX to enforce referential integrity if a CustomerID is deleted.**

MissingCustomerCheck = CALCULATE( COUNTROWS(Sales), NOT(Sales[CustomerID] IN VALUES(Customers[CustomerID])) )