1. What does DAX stand for?

- **DAX = Data Analysis Expressions**
  It's the formula language in Power BI, Excel Power Pivot, and Analysis Services, used for creating **measures, calculated columns, and custom calculations**.

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2. Write a DAX formula to sum the Sales column.

```
Total Sales = SUM(Sales[Sales])
```

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3. What is the difference between a calculated column and a measure?

- **Calculated Column**:
  - Computed row by row.
  - Stored in the table (increases data size).
  - Example: Profit = Sales – Cost (for each row).
- **Measure**:
  - Calculated on the fly, based on filters and context.
  - More efficient (not stored, only calculated when needed).
  - Example: Total Sales, Average Profit.

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4. Use the DIVIDE function to calculate Profit Margin (Profit/Sales).

```
Profit Margin = DIVIDE(SUM(Sales[Profit]), SUM(Sales[Sales]), 0)
```

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5. What does COUNTROWS() do in DAX?

- `COUNTROWS(Table)` → returns the number of rows in a table or filter context.
  Example:

```
Product Count = COUNTROWS(Products)
```

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6. Create a measure: Total Profit that subtracts total cost from total sales

```
Total Profit = SUM(Sales[Sales]) - SUM(Sales[Cost])
```

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7. Write a measure to calculate Average Sales per Product.

```
Average Sales per Product = AVERAGEX(VALUES(Sales[Product]),
SUM(Sales[Sales]))
```

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8. Use IF() to tag products as "High Profit" if Profit > 1000.

```
High Profit Tag =
IF(Sales[Profit] > 1000, "High Profit", "Low Profit")
```

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9. What is a circular dependency error in a calculated column?

- Happens when a column depends (directly or indirectly) on itself.
- Example: If `Column A` formula depends on `Column B`, but `Column B` also depends on `Column A`.

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10. Explain row context vs. filter context.

- **Row context** → Calculations happen per row (in calculated columns, iterators like `SUMX`).
- **Filter context** → Filters applied from visuals/slicers/measures to determine what data is included.

Example:

- Row context = Each row's Profit = Sales – Cost.
- Filter context = Total Sales for *Region* = *East*.

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11. Write a measure to calculate YTD Sales using TOTALYTD().

```
YTD Sales = TOTALYTD(SUM(Sales[Sales]), Sales[Date])
```

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12. Create a dynamic measure that switches between Sales, Profit, and Margin.

1. Create a **disconnected table** with options: *Sales, Profit, Margin*.
2. Create a measure:

```
Dynamic Measure =
SWITCH(
    SELECTEDVALUE(Metrics[Measure]),
    "Sales", SUM(Sales[Sales]),
    "Profit", SUM(Sales[Profit]),
    "Margin", DIVIDE(SUM(Sales[Profit]), SUM(Sales[Sales]), 0)
)
```

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13. Optimize a slow DAX measure using variables (VAR).

Instead of repeating calculations:

```
Optimized Profit Margin =
VAR TotalSales = SUM(Sales[Sales])
VAR TotalProfit = SUM(Sales[Profit])
RETURN DIVIDE(TotalProfit, TotalSales, 0)
```

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14. Use CALCULATE() to override a filter

```
Sales USA =
CALCULATE(
    SUM(Sales[Sales]),
    Sales[Region] = "USA"
)
```

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15. Write a measure that returns the highest sales amount

```
Max Sales = MAX(Sales[Sales])
```

If you want the **max total sales across all products**:

```
Max Total Sales = MAXX(VALUES(Sales[Product]), SUM(Sales[Sales]))
```