# Power BI - lesson 18

## Puzzle 1: Confusing Totals

**Why is the total different?**

Because the total row recalculates `Sales / Quantity` in the total filter context, not as a sum of row-by-row results.

- At row level: ratio = Sales ÷ Quantity.
- At total level: ratio = (SUM(Sales) ÷ SUM(Quantity)).

👉 To force row-wise logic:

```
Sales per Quantity =
SUMX ( Sales, DIVIDE ( Sales[Sales], Sales[Quantity] ) )
```

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## Puzzle 2: Filtered vs. Unfiltered Totals

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

Total Sales All Categories =
CALCULATE ( [Total Sales], ALL ( Sales[Category] ) )

% of Total =
DIVIDE ( [Total Sales], [Total Sales All Categories] )
```

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## Puzzle 3: Changing Context with Slicers

**Why card changes?** → Because slicers filter the data model, altering the filter context for the measure.

**Ignore slicer:**

```
Total Sales Ignore Country =
CALCULATE ( [Total Sales], ALL ( Sales[Country] ) )
```

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# Puzzle 4: Misleading Average

**Problem:**

```
Average Sales = [Total Sales] / [Total Orders]
```

This gives misleading results because totals divide *aggregates*, not row-by-row.

**Fix:**

```
Average Sales per Order =
AVERAGEX ( Sales, DIVIDE ( Sales[Sales], Sales[OrderID] ) )
```

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# Puzzle 5: Highlight Top Product per Category

```
Rank Product =
RANKX (
    FILTER ( ALL ( Sales[Product] ), Sales[Category] = EARLIER ( Sales[Categor
y] ) ),
    [Total Sales],
    ,
    DESC
)
```

```
-- Apply a visual filter: [Rank Product] = 1
```

## Puzzle 6: Unexpected Blank Values

**Why?** → If a customer has no France sales, CALCULATE returns blank.

**Fix:**

```
Sales in France =
COALESCE (
    CALCULATE ( SUM ( Sales[Sales] ), Sales[Country] = "France" ),
    0
)
```

## Puzzle 7: Time Intelligence Confusion

```
Previous Month Sales =
CALCULATE ( [Total Sales], PREVIOUSMONTH ( 'Date'[Date] ) )

-- Optional edge handling
Previous Month Sales Safe =
IF ( ISBLANK ( [Previous Month Sales] ), 0, [Previous Month Sales] )
```

## Puzzle 8: Row-Level Calculation

**Why use SUMX?**

If you just do `SUM(Sales[Quantity]) * SUM(Sales[Discount per Unit])`, you multiply aggregates, not row values. `SUMX` enforces row-by-row multiplication:

```
Total Discount =
SUMX ( Sales, Sales[Quantity] * Sales[Discount per Unit] )
```

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## Puzzle 9: Rank with Ties

```
Rank by Sales =
RANKX (
    ALL ( Sales[City] ),
    [Total Sales],
    ,
    DESC,
    DENSE
)
```

- `DENSE` = no gaps in rank if ties occur.
- Change to `SKIP` if you want Excel-style ranking.

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## Puzzle 10: Dynamic Titles and KPIs

```
Title =
"Sales for " & SELECTEDVALUE ( Sales[Country], "All Countries" )
```