Sweet Crumbs Bakery

Power BI Dashboard Assignment

Full Assignment Guide

Questions · KPIs · Case Scenarios · Expected Insights · Scoring Rubric

Background

Sweet Crumbs Bakery is a growing artisan bakery based in Kumasi, Ghana, with delivery reach across five regions: Ashanti, Greater Accra, Western, Central, and Eastern. Founded in 2021, the bakery sells freshly baked bread, pastries, cakes, and snacks through multiple channels including walk-in, phone orders, WhatsApp, and an online store. The business employs five staff members and accepts payment by Cash, Card, Mobile Money, and Online transfer.

The Problem

The bakery owner, Madam Akosua Boateng, has two years of transaction data (2023–2024) but has never visualised it. She suspects that:

- Some products are popular but barely profitable due to high discounts.
- Certain channels generate much higher average order values than others.
- Sales dip significantly in mid-year and spike in Q4 — but she has no proof.
- One or two staff members consistently outsell the rest.

She has hired you as a junior data analyst to build her a Power BI dashboard to confirm or challenge these assumptions.

Your Task

Using the 1,500-row Bakery_Sales_Data dataset, build a professional 4-page Power BI dashboard that:

1. Answers Madam Akosua's four business questions with data.
2. Displays at least 7 KPI measures (see Section 1).
3. Is interactive, clearly labelled, and tells a coherent business story.
4. Concludes with 2+ data-backed recommendations the owner can act on.

KPIs Students Should Build in Power BI

The following KPIs are required for your dashboard. They are grouped by business theme. All 7 mandatory KPIs (marked with points) must be implemented as DAX measures.

#	KPI Name	Business Question Answered	Recommended Visual	Page	Pts
1	**Total Revenue**	What is total income across 2023–2024? Which year did better?	*KPI Card + Line chart*	Pg 1	5
2	**Gross Profit & Margin %**	How much profit after costs? Is the margin healthy?	*KPI Card + Bar by Category*	Pg 1–2	5
3	**Average Order Value (AOV)**	What does a customer spend per order on average?	*KPI Card + Bar by Channel*	Pg 1–3	5
4	**Total Orders & Qty Sold**	How many orders? Which product & day is busiest?	*KPI Cards + Bar charts*	Pg 1–2	5
5	**Revenue by Time Period (MoM + Quarterly)**	Is revenue growing? Does Q4 outperform the rest?	*Line + Clustered Bar*	Pg 1	10
6	**Return Rate % & Discount Impact**	What % returned? Are discounts hurting margins?	*KPI Card + Table + Bar*	Pg 2	5
7	**Staff Revenue & Top Products**	Which staff & products generate the most revenue?	*Horizontal Bar + Bar*	Pg 2–3	5
	TOTAL KPI POINTS				**40 pts**

Sales Performance KPIs

- Total Revenue — Sum of Revenue_GHS
- Total Orders — Count of Order_ID
- Average Order Value (AOV) — Revenue ÷ Orders
- Revenue by Month/Quarter/Year — Time intelligence trend line

Profitability KPIs

- Gross Profit — Revenue minus COGS
- Gross Profit Margin (%) — Gross Profit ÷ Revenue
- Revenue vs COGS Comparison — Clustered bar chart

Product & Category Analysis

- Top 5 Best-Selling Products — By revenue and by quantity
- Sales by Category — Pie or donut chart
- Average Discount by Product — Which products are most discounted

Customer & Channel Insights

- Revenue by Customer Type — Walk-in vs Regular vs Corporate
- Revenue by Order Channel — In-Store vs Online vs WhatsApp etc.
- Revenue by Payment Method

Staff & Operations

- Revenue by Staff Member — Staff performance leaderboard
- Returns Rate (%) — Count of returns ÷ total orders
- Revenue by District — Map visual or bar chart

Time Intelligence (Intermediate)

- Month-over-Month Revenue Growth (%)
- Best-Performing Day of the Week
- Seasonal Trend Analysis (Q4 vs other quarters)

KPI Hierarchy — Linking KPIs to Business Questions

Use this table to understand which KPIs directly answer each of Madam Akosua's four business questions.

Business Question	What Madam Akosua Wants to Know	KPIs That Answer It	How to Visualise the Answer
BQ 1	Are some products popular but barely profitable due to discounts?	**KPI 2 (Gross Margin %) + KPI 6 (Discount Impact)**	Analyse gross margin % by product. Cross-reference with Avg Discount % per product.
BQ 2	Do certain channels generate much higher order values than others?	**KPI 3 (AOV by Channel) + KPI 4 (Orders by Channel)**	Break AOV down by Order_Channel and Customer_Type using a clustered bar chart.
BQ 3	Do sales dip in mid-year and spike in Q4?	**KPI 5 (MoM Growth % + Quarterly Revenue)**	A 24-month line chart + quarterly comparison bar chart (Q1–Q4 side by side).
BQ 4	Do one or two staff members consistently outsell the rest?	**KPI 7 (Staff Revenue + Product Ranking)**	Horizontal bar chart sorted by Revenue descending — compare 2023 vs 2024.

Section 1 — KPI Calculations & Measures (40 pts)

For each KPI below you are given the DAX formula, the dataset columns it uses, guided questions to answer in your dashboard, and the expected insight.

KPI 1 — Total Revenue (5 pts)

DAX Formula	*Total Revenue = SUM('Sales_Data'[Revenue_GHS])*
Columns Used	Revenue_GHS
Questions	Q1: What is the total revenue generated by Sweet Crumbs Bakery across 2023 and 2024 combined? Q2: Which year generated more revenue — 2023 or 2024? By how much (GHS and %)?
Expected Insight	Expected: ~GHS 85,000–95,000 total. 2024 should show ~8–12% growth over 2023 due to seasonal weighting. Display as a KPI card on Page 1.

KPI 2 — Gross Profit & Gross Margin % (5 pts)

DAX Formula	*Gross Profit = SUM(Revenue_GHS) - SUM(COGS_GHS) Gross Margin % = DIVIDE([Gross Profit], [Total Revenue])*
Columns Used	Revenue_GHS, COGS_GHS
Questions	Q3: What is the overall gross profit margin for the bakery? Is it healthy for a food business? Q4: Which product CATEGORY has the highest gross margin % — Bread, Pastry, Cake, or Snack?
Expected Insight	Expected margin: ~60–68%. Cakes typically have the highest margin. Bread has the lowest. A healthy food retail margin is 50–70%, so the bakery is performing well.

KPI 3 — Average Order Value (AOV) (5 pts)

DAX Formula	*AOV = DIVIDE([Total Revenue], DISTINCTCOUNT('Sales_Data'[Order_ID]))*
Columns Used	Revenue_GHS, Order_ID
Questions	Q5: What is the average value of a single order? Q6: Which Order Channel has the highest AOV — In-Store, Phone, Online, or WhatsApp? Q7: Does Customer Type (Walk-in vs Regular vs Corporate) affect AOV significantly?
Expected Insight	Expected AOV: ~GHS 12–18. Online/WhatsApp orders likely have higher AOV. Corporate customers will have the highest AOV — they order in bulk. Walk-in customers will have the lowest.

KPI 4 — Total Orders & Quantity Sold (5 pts)

DAX Formula	*Total Orders = DISTINCTCOUNT([Order_ID]) Total Qty Sold = SUM([Quantity])*

Columns Used	Order_ID, Quantity
Questions	Q8: How many total orders were placed across both years? Q9: Which product had the highest total quantity sold? Q10: Which day of the week records the most orders?
Expected Insight	Expected: ~1,500 orders, ~3,000–4,500 units sold. Croissants and Vanilla Cupcakes rank highest in quantity. Weekend days typically see more walk-in traffic.

KPI 5 — Revenue by Time Period — MoM Growth & Quarterly (10 pts)

DAX Formula	*Prev Month Rev = CALCULATE([Total Revenue], DATEADD('DateTable'[Date],-1,MONTH)) MoM Growth % = DIVIDE([Total Revenue]-[Prev Month Rev], [Prev Month Rev])*
Columns Used	Date (requires DateTable)
Questions	Q11: In which month of 2023 and 2024 was revenue highest? Q12: Which month had the biggest MoM positive jump? The biggest drop? Q13: Compare Q1 vs Q4 revenue. Does the data support Madam Akosua's Q4 belief?
Expected Insight	Expected: November and December are the top months (1.3x seasonal factor). Q4 should be ~25–35% stronger than Q2. MoM dips likely in June–August. A 24-month line chart will show this clearly.

KPI 6 — Return Rate % & Discount Impact (5 pts)

DAX Formula	*Return Rate % = DIVIDE(COUNTROWS(FILTER('Sales_Data',[Return_Flag]="Yes")), [Total Orders]) Avg Discount % = AVERAGE([Discount_Pct])*
Columns Used	Return_Flag, Discount_Pct, Discount_Amount_GHS
Questions	Q14: What percentage of orders were returned? Is this a concern for the business? Q15: Which products have the highest average discount %? Does discounting correlate with more returns? Q16: How much total revenue was lost to discounts across both years?
Expected Insight	Expected return rate: ~3%. Industry average for perishables is 2–5%, so this is acceptable. Total discount leakage: ~GHS 2,800–3,200 across both years.

KPI 7 — Staff Revenue & Top Product Ranking (5 pts)

DAX Formula	*Product Rank = RANKX(ALL('Sales_Data'[Product_Name]), [Total Revenue],,DESC)*
Columns Used	Staff_Name, Product_Name, Revenue_GHS
Questions	Q17: Which staff member generated the most revenue in 2024? Did the same person lead in 2023? Q18: List the Top 5 products by revenue. What share of total revenue do they account for? Q19: Is there a product ranked Top 5 for quantity but NOT Top 5 for revenue? What does this tell you?
Expected Insight	Top 5 products likely account for 60–70% of total revenue (Pareto principle). Macaroons may rank high in quantity but low in revenue — high volume, thin margin 'traffic drivers'.

Section 3 — Data Modelling & Preparation (15 pts)

M1 — Clean & Type Data in Power Query (5 pts)

Step-by-Step Instructions

5. In Power BI, click Transform Data to open Power Query Editor.
6. Select the Date column → change type to Date.
7. Select Revenue_GHS, COGS_GHS, Gross_Profit_GHS, Unit_Price_GHS, Unit_Cost_GHS, Discount_Amount_GHS → change type to Decimal Number.
8. Select Quantity, Discount_Pct, Year → change type to Whole Number.
9. Confirm Order_ID, Product_Name, Category, Staff_Name, Return_Flag are set to Text.
10. Click Close & Apply.

Questions

Q28: A student's SUM(Revenue_GHS) measure returns BLANK. The column shows 'ABC Text' in Power Query. What went wrong and how do you fix it?

Q29: The Date column was imported as a whole number (e.g. 20230415). Write the Power Query M step to convert it to a proper Date.

> Why It Matters: If Revenue is stored as Text, ALL financial DAX measures (SUM, AVERAGE, etc.) will return blank or error. Fixing data types is the FIRST step before writing any DAX.

M2 — Create a Date / Calendar Table (5 pts)

Questions

Q30: A student uses the auto date hierarchy instead of a custom Date table. Their MoM Growth % using DATEADD returns an error. Explain why, and what they must do to fix it.

Q31: Write the complete DAX to create a DateTable with columns: Date, Year, MonthNum, MonthName, Quarter, DayName.

> Why It Matters: DATEADD, TOTALYTD, PREVIOUSMONTH, SAMEPERIODLASTYEAR — all fail without a marked Date table. This is the single most common reason student time-intelligence measures do not work.

M3 — Relationships & Model Design (5 pts)

Step-by-Step Instructions

11. Click the Model view icon (left sidebar).

12. Drag DateTable[Date] → Sales_Data[Date] to create a relationship. Cardinality: One-to-Many (1:*). Cross-filter direction: Single.
13. Verify no relationships show a warning icon.
14. Create a Measures Table: Home > Enter Data > name it 'Measures' > Load. Move all DAX measures into this table.
15. Hide the Date column in Sales_Data from Report view to keep the field list clean.

Section 4 — Insight & Business Storytelling (15 pts)

I1 — Key Findings Summary (5 pts)

Instructions

Add a new dashboard page titled 'Insights'. Insert a Text Box and write at least 1 findings from your data. Each finding must reference a specific number from your dashboard. Structure each finding as:

- Finding: [What you observed]
- Evidence: [Specific KPI value or chart result]

Question Q35

Write 3 findings in the required format (Finding + Evidence with a specific number). Minimum 3 findings covering different sections — one on products, one on time, one on staff or channel.

Sample Model Answers

Finding 1	Q4 is the strongest quarter
Finding	Q4 is the bakery's strongest quarter by far.
Evidence	Q4 2024 generated GHS 27,400 — approximately 32% more than Q2 2024 (GHS 20,750), confirming seasonal peaks in November–December.
Finding 2	**Croissants lead in revenue**
Finding	Croissants lead in revenue despite not being the most expensive product.
Evidence	Croissants generated GHS 9,840 (approx. 11% of total revenue), driven by the highest order volume of any single product.
Finding 3	**Corporate customers deliver highest AOV**
Finding	Corporate customers deliver 2.4x the AOV of walk-in customers.
Evidence	Corporate AOV approx. GHS 28.60 vs Walk-in AOV approx. GHS 11.90, making corporate accounts the highest-value segment despite lower order count.

Question Q38

Madam Akosua is considering dropping Macaroons from the menu because 'they don't seem worth it'. Using your dashboard, write a data-driven response that either supports or challenges her decision.

Sample Model Answers

Recommendation 1	Launch a Corporate Catering Package
Action	Launch a 'Corporate Catering Package' targeting business clients.
Based on	Corporate customers have an AOV of GHS 28.60 — 2.4x higher than walk-in — but make up only 12% of orders.
Benefit	Converting 50 additional walk-in customers to corporate accounts per year could increase annual revenue by ~GHS 4,200.
Recommendation 2	**Reduce Discounts on Brownies & Macaroons**
Action	Reduce discounts on Brownies and Macaroons by 50% in the next quarter.
Based on	These products have the thinnest gross margins in the Snack category (~55%) but carry average discounts of 10–12%, eroding net contribution.
Benefit	Reducing discount leakage on these two products could recover ~GHS 400–600 in annual gross profit.

I3 — Multi-Page Navigation & UX (5 pts)

Instructions

Create at least 4 named dashboard pages:

- Page 1: Overview — KPI cards + top-level charts
- Page 2: Product & Category Analysis
- Page 3: Staff & Channel Performance
- Page 4: Insights & Recommendations

Add navigation buttons (Insert > Buttons > Navigator) or custom image buttons linked to pages using Action > Page Navigation. Add tooltips to at least 2 visuals. Add your name and submission date in a footer on every page.

Sample Answer — Q40: Tooltip Page for Revenue by Product

- Product Name (as title)
- Total Revenue — GHS #,##0
- Gross Profit — GHS #,##0
- Gross Margin % — 0.0%
- Average Discount % — 0.0%
- Total Orders — count
- Return Rate % — 0.0%

Scoring Rubric — 100 Points Total

Each criterion is scored across 4 levels: Excellent (full marks), Good (partial), Developing (minimal), and Not Attempted (0).

Section 1 — KPI Calculations (40 pts)

Criterion	Excellent (Full)	Good (Partial)	Developing (Minimal)	Not Attempted (0)
Total Revenue (5 pts)	Correct DAX, value matches source data.	Measure exists but minor variance <5%.	Measure present but significant errors.	Missing or placeholder.
Gross Profit & Margin % (5 pts)	Both measures correct; % formatted to 1 decimal.	One correct, one has minor error.	Both present but formula errors.	Missing.
AOV (5 pts)	AOV = Revenue ÷ DISTINCTCOUNT(Order_ID); correct.	AOV uses row count instead of order count.	Present with notable formula error.	Missing.
Total Orders & Qty Sold (5 pts)	Both correct and clearly labelled.	One correct; other uses wrong aggregation.	Both present but aggregation errors.	Missing.
MoM Growth & Quarterly (10 pts)	DATEADD used correctly; quarterly totals accurate.	Quarterly correct but MoM missing or static.	Some time grouping but no DAX time-intelligence.	No time analysis attempted.
Return Rate % & Discount Impact (5 pts)	Both measures correct and formatted.	One of the two measures correct.	Both present but errors in formula/filter.	Missing.
Staff Revenue & Top Products (5 pts)	RANKX or TOPN used correctly for ranking.	Revenue correct; ranking uses sort instead of DAX.	One measure with minor issues.	Missing.

Section 2 — Visual Design & Layout (30 pts)

Criterion	Excellent (Full)	Good (Partial)	Developing (Minimal)	Not Attempted (0)
Chart Type Appropriateness (8 pts)	All chart types match the data and question type.	Most charts appropriate; 1–2 questionable choices.	Several inappropriate chart types.	All default tables, no chart customisation.
Visual Hierarchy & Layout (7 pts)	KPI cards at top; charts logically grouped; no clutter.	Reasonable layout with minor spacing issues.	Crowded or random placement.	Single page dump with no structure.
Consistent Colour Theme (5 pts)	Cohesive 2–3 colour palette; colour encodes meaning.	Mostly consistent; 1–2 visuals break palette.	Multiple unrelated colours.	Default colours only, no customisation.

Titles, Labels & Formatting (5 pts)	All visuals titled; axes labelled; GHS/% formatting consistent.	Most labelled; minor formatting inconsistencies.	Several untitled visuals or missing axis labels.	No titles or labels.
Slicers & Interactivity (5 pts)	At least 3 working slicers; cross-filtering correct.	2 slicers present; most interactions work.	1 slicer only or slicers don't filter visuals.	No slicers or filters.

Section 3 — Data Modelling & Preparation (15 pts)

Criterion	Excellent (Full)	Good (Partial)	Developing (Minimal)	Not Attempted (0)
Data Types in Power Query (5 pts)	All columns correctly typed; no errors in Power Query.	Most types correct; 1–2 columns wrong type.	Several type issues causing visual errors.	Data not cleaned; all columns as text.
Date / Calendar Table (5 pts)	Dedicated Date table; marked as Date table; linked.	Date table created but not marked or has gaps.	Uses auto hierarchy only; no custom table.	No date structure; dates used as text.
Relationships & Model View (5 pts)	All relationships correctly defined; no ambiguous ones.	Relationships set but direction/cardinality error.	Some relationships missing; cross-filter issues.	No relationships defined; flat table only.

Section 4 — Insight & Business Storytelling (15 pts)

Criterion	Excellent (Full)	Good (Partial)	Developing (Minimal)	Not Attempted (0)
Key Findings Summary (5 pts)	3+ data-backed findings with specific numbers.	1–2 insights; mostly descriptive.	Single generic observation; no data reference.	No findings or summary.
Actionable Recommendations (5 pts)	2+ clear recommendations tied to KPI findings.	1 recommendation; loosely linked to data.	Generic and not data-driven.	No recommendations.
Dashboard Navigation & UX (5 pts)	4 named pages; navigation buttons; tooltips on 2+ visuals.	2+ pages but navigation unclear; some tooltips.	Multi-page but no navigation aids.	Single unstructured page.

TOTAL: 100 Points

Grade Scale

Score	Grade	Description
90–100	**Distinction**	Outstanding mastery of Power BI; publication-ready dashboard.
75–89	**Merit**	Strong understanding; minor gaps in DAX or design polish.
60–74	**Pass**	Core KPIs present; design and modelling need improvement.

Below 60	**Needs Improvement**	Significant gaps in KPIs, model, or visual quality.

DAX Quick Reference Card

These 10 DAX functions cover everything needed for this assignment.

Function	What It Does	Example from This Assignment
SUM(column)	Adds all values in a column	*SUM('Sales_Data'[Revenue_GHS])*
DIVIDE(num, denom)	Safe division — returns 0 if denominator is 0	*DIVIDE([Gross Profit], [Total Revenue])*
DISTINCTCOUNT(column)	Counts unique values	*DISTINCTCOUNT('Sales_Data'[Order_ID])*
CALCULATE(measure, filter)	Evaluates a measure in a modified filter context	*CALCULATE([Total Revenue], 'Sales_Data'[Year]=2024)*
DATEADD(dates, n, interval)	Shifts a date column by n periods	*DATEADD('DateTable'[Date],-1,MONTH)*
FILTER(table, condition)	Returns a subset of rows matching a condition	*FILTER('Sales_Data',[Return_Flag]="Yes")*
RANKX(table, expression)	Ranks rows by an expression	*RANKX(ALL('Sales_Data'[Product_Name]),[Total Revenue],,DESC)*
FORMAT(value, format)	Formats a number as text with a pattern	*FORMAT([Date],"MMMM")*
CALENDAR(start, end)	Creates a table of consecutive dates	*CALENDAR(DATE(2023,1,1),DATE(2024,12,31))*
AVERAGE(column)	Average of all values in a column	*AVERAGE('Sales_Data'[Discount_Pct])*

Submission Checklist

Tick all boxes before submitting your .pbix file:

- ☐ All 7 KPI measures created and visible in a Measures table in the model
- ☐ Date table created, marked as Date table, and MonthName sorted by MonthNum
- ☐ Relationship between DateTable[Date] and Sales_Data[Date] defined (One-to-Many)
- ☐ Dashboard has at least 4 named pages with navigation buttons
- ☐ At least 3 slicers added and cross-filtering tested on all pages
- ☐ Insights page includes at least 3 findings and at least 2 recommendations with data references
- ☐ All visuals have titles, labelled axes, and formatted numbers (GHS / %)
- ☐ File saved as: YourName_BakeryDashboard.pbix

Good luck — analyze boldly, design clearly, and tell a story the bakery owner can act on.