TechMentors

Excel Level 2 • Exercise 1

Grandma Madeline's Sales: Formula Review

Tables • Calculated Columns • Remove Duplicates • AutoFill • SUMIFS • Mixed References • Line Charts

Overview

Grandma Madeline's kitchen sells baked goods and prepared meals. Her sales clerk has exported every sale from January 2025 through November 25, 2026: 1,200 rows of raw data. Grandma wants to know which products sell best each month, and how each category of food changes with the seasons.

In this review exercise you will turn the raw data into an Excel Table, add calculated columns, and then build a summary report with formulas. The report looks like a PivotTable, but you build every piece of it yourself. A drop-down lets Grandma switch between 2025 and 2026, and a line chart updates automatically.

Estimated time: 90–120 minutes. In the next exercise you will build the same kind of report with a PivotTable, so pay attention to how much work each step takes!

What you will practice

- Navigating a large list with keyboard shortcuts and freezing panes
- Converting a range to a Table and adding calculated columns
- Using YEAR and TEXT to pull the year and month out of a date
- Creating a list of unique items with Remove Duplicates, and fixing dirty data with Find & Replace
- Using AutoFill to create month headings
- Writing one SUMIFS formula with mixed references and filling it across a whole grid
- Adding row and column totals in one step with AutoSum, and calculating percent of total
- Creating a drop-down list with Data Validation
- Building a line chart with a title linked to a cell

How to read these instructions

Bold blue-gray text is a ribbon path or button. **Data > Data Tools > Remove Duplicates** means: click the Data tab, find the Data Tools group, and click Remove Duplicates.

Blue text is a cell, range, or sheet name. `Red code text` is something you type exactly as shown.

Check every "Check your work" box before you go on. Later steps depend on earlier ones.

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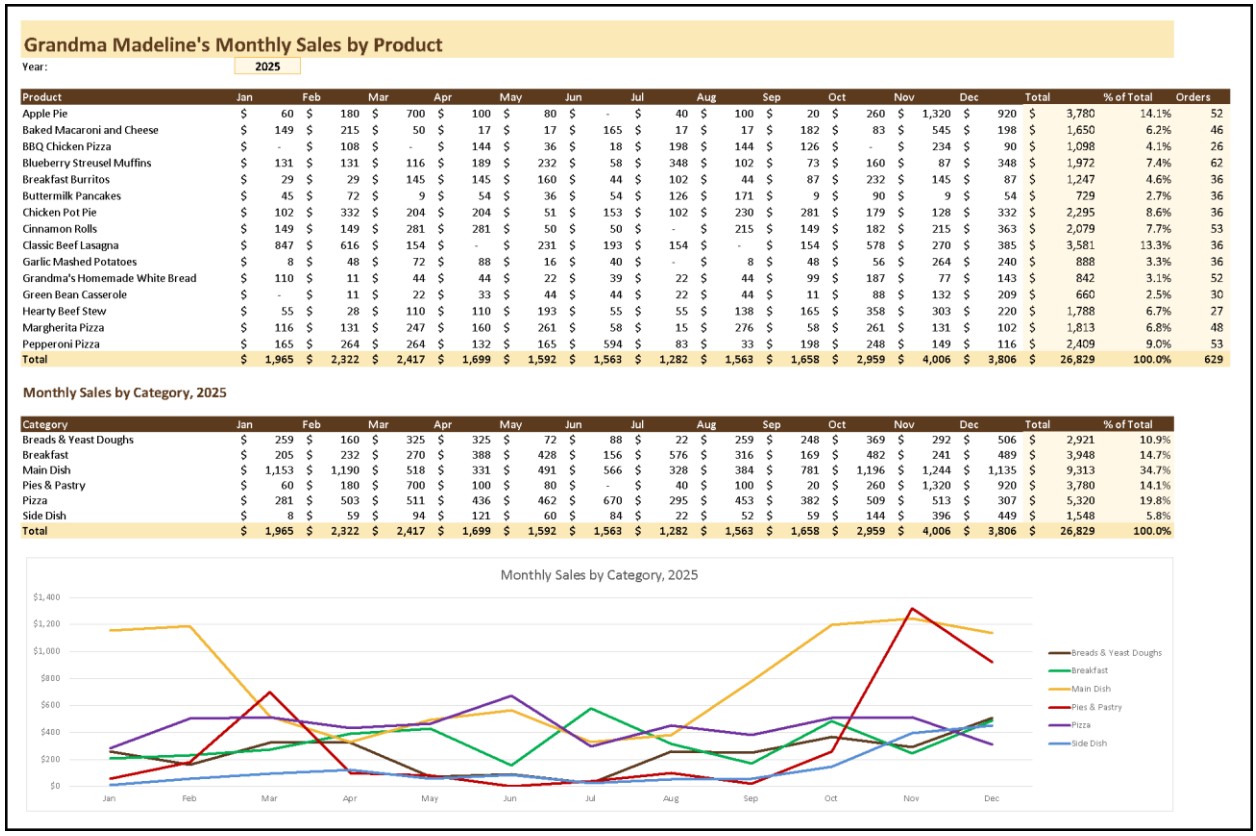
The finished Product Summary sheet

Here is what your Product Summary sheet will look like when you finish. (The Orders column on the right comes from the Extra Credit.)



Grandma Madeline's Monthly Sales by Product

Year: 2025

Product	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% of Total	Orders
Apple Pie	$ 60	$ 180	$ 700	$ 100	$ 80	$ -	$ 40	$ 100	$ 20	$ 260	$ 1,320	$ 920	$ 3,780	14.1%	52
Baked Macaroni and Cheese	$ 149	$ 215	$ 50	$ 17	$ 17	$ 165	$ 17	$ 17	$ 182	$ 83	$ 545	$ 198	$ 1,650	6.2%	46
BBQ Chicken Pizza	$ -	$ 108	$ -	$ 144	$ 36	$ 18	$ 198	$ 144	$ 126	$ -	$ 234	$ 90	$ 1,098	4.1%	26
Blueberry Streusel Muffins	$ 131	$ 131	$ 116	$ 189	$ 232	$ 58	$ 348	$ 102	$ 73	$ 160	$ 87	$ 348	$ 1,972	7.4%	62
Breakfast Burritos	$ 29	$ 29	$ 145	$ 145	$ 160	$ 44	$ 102	$ 44	$ 87	$ 232	$ 145	$ 87	$ 1,247	4.6%	36
Buttermilk Pancakes	$ 45	$ 72	$ 9	$ 54	$ 36	$ 54	$ 126	$ 171	$ 9	$ 90	$ 9	$ 54	$ 729	2.7%	36
Chicken Pot Pie	$ 102	$ 332	$ 204	$ 204	$ 51	$ 153	$ 102	$ 230	$ 281	$ 179	$ 128	$ 332	$ 2,295	8.6%	36
Cinnamon Rolls	$ 149	$ 149	$ 281	$ 281	$ 50	$ 50	$ -	$ 215	$ 149	$ 182	$ 215	$ 363	$ 2,079	7.7%	53
Classic Beef Lasagna	$ 847	$ 616	$ 154	$ -	$ 231	$ 193	$ 154	$ -	$ 154	$ 578	$ 270	$ 385	$ 3,581	13.3%	36
Garlic Mashed Potatoes	$ 8	$ 48	$ 72	$ 88	$ 16	$ 40	$ -	$ 8	$ 48	$ 56	$ 264	$ 240	$ 888	3.3%	36
Grandma's Homemade White Bread	$ 110	$ 11	$ 44	$ 44	$ 22	$ 39	$ 22	$ 44	$ 99	$ 187	$ 77	$ 143	$ 842	3.1%	52
Green Bean Casserole	$ -	$ 11	$ 22	$ 33	$ 44	$ 44	$ 22	$ 44	$ 11	$ 88	$ 132	$ 209	$ 660	2.5%	30
Hearty Beef Stew	$ 55	$ 28	$ 110	$ 110	$ 193	$ 55	$ 55	$ 138	$ 165	$ 358	$ 303	$ 220	$ 1,788	6.7%	27
Margherita Pizza	$ 116	$ 131	$ 247	$ 160	$ 261	$ 58	$ 15	$ 276	$ 58	$ 261	$ 131	$ 102	$ 1,813	6.8%	48
Pepperoni Pizza	$ 165	$ 264	$ 264	$ 132	$ 165	$ 594	$ 83	$ 33	$ 198	$ 248	$ 149	$ 116	$ 2,409	9.0%	53
Total	$ 1,965	$ 2,322	$ 2,417	$ 1,699	$ 1,592	$ 1,563	$ 1,282	$ 1,563	$ 1,658	$ 2,959	$ 4,006	$ 3,806	$ 26,829	100.0%	629

Monthly Sales by Category, 2025

Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% of Total
Breads & Yeast Doughs	$ 259	$ 160	$ 325	$ 325	$ 72	$ 88	$ 22	$ 259	$ 248	$ 369	$ 292	$ 506	$ 2,921	10.9%
Breakfast	$ 205	$ 232	$ 270	$ 388	$ 428	$ 156	$ 576	$ 316	$ 169	$ 482	$ 241	$ 489	$ 3,948	14.7%
Main Dish	$ 1,153	$ 1,190	$ 518	$ 331	$ 491	$ 566	$ 328	$ 384	$ 781	$ 1,196	$ 1,244	$ 1,135	$ 9,313	34.7%
Pies & Pastry	$ 60	$ 180	$ 700	$ 100	$ 80	$ -	$ 40	$ 100	$ 20	$ 260	$ 1,320	$ 920	$ 3,780	14.1%
Pizza	$ 281	$ 503	$ 511	$ 436	$ 462	$ 670	$ 295	$ 453	$ 382	$ 509	$ 513	$ 307	$ 5,320	19.8%
Side Dish	$ 8	$ 59	$ 94	$ 121	$ 60	$ 84	$ 22	$ 52	$ 59	$ 144	$ 396	$ 449	$ 1,548	5.8%
Total	$ 1,965	$ 2,322	$ 2,417	$ 1,699	$ 1,592	$ 1,563	$ 1,282	$ 1,563	$ 1,658	$ 2,959	$ 4,006	$ 3,806	$ 26,829	100.0%

Use this map of rows and columns as you build:

Rows	Column A	Columns B–M	Column N	Column O
1–2	Title; Year: 2025 ▼	Title		
4	Product	Jan … Dec	Total	% of Total
5–19	15 products	SUMIFS formulas	Row totals	Percent
20	Total	Column totals	Grand total	100%
22–31	Category title, headings, 6 categories, Total	SUMIFS by Category	Totals	Percent
33+	Line chart of the six categories			

Part 1: Open and Explore the Data

1. Download GrandmaMadeline_Sales_Formulas_START.xlsx from theTechMentors.com/free-stuff/grandma-madeline-sales and open it. Choose File > Save As, and save a copy named `Grandma Sales Formulas - Your Name`.
2. On the Sales Data sheet, click A1 and press Ctrl+Down Arrow. Excel jumps to the last row of data.

> **✓ Check your work**
> The last row of data is row 1201: one heading row plus 1,200 sales.

3. Press Ctrl+Home to jump back to A1.
4. Keep the headings visible while you scroll: View > Window > Freeze Panes > Freeze Top Row. Scroll down to test it.

> **Tip**
> Ctrl+Arrow keys jump to the edge of the data. Add Shift (Ctrl+Shift+Down Arrow) to *select* everything from the current cell to the edge. You'll use both today.

Part 2: Create the Sales Table

5. Click any cell in the data, for example A2. Choose Insert > Tables > Table (or press Ctrl+T). Confirm the range is `=$A$1:$E$1201`, make sure My table has headers is checked, and click OK.
6. Name the table: Table Design > Properties > Table Name, type `Sales`, and press Enter.
7. Choose a warm color for the table: Table Design > Table Styles, and pick an orange or gold medium style.

> **✓ Check your work**
> Clicking any cell in the data shows the Table Design tab, and the Table Name box reads Sales.

Add the Extended Price column

8. Click F1, type `Extended Price`, and press Enter. The table grows to include column F automatically.
9. In F2, build the formula by pointing: type `=`, click D2, type `*`, click E2, and press Enter. Excel writes:

```
=[@[Purchase Qty]]*[@Price]
```

> **Why it works**
> This is a calculated column. The `[@[Purchase Qty]]` means the Purchase Qty, the `@` means in this row, and the inner square brackets are needed because of the space. The `[@Price]` means "the Price in this row." Because this is a Table, Excel should copy the formula down all 1,200 rows for you. If not, double-click the bottom-right corner of cell F2 to AutoFill the formula to all the rows.

> **✓ Check your work**
> F2 = $60.00 (3 Apple Pies × $20.00).
> Select column F's data (click F2, then Ctrl+Shift+Down Arrow) and look at the status bar at the bottom of the window: Sum: $54,244.50, Count: 1200.
> If the numbers don't show dollar signs, select column F's data and choose Home > Number > Number Format (the drop-down box) > Currency.

> **Tip**
> Formula didn't fill down? Click the lightning-bolt AutoCorrect Options button beside the cell and choose Overwrite all cells in this column with this formula. If this happens every time, turn the feature back on: File > Options > Proofing > AutoCorrect Options > AutoFormat As You Type, check Fill formulas in tables to create calculated columns, and click OK.

Add Year and Month columns

Your summary report needs to add up sales for one month of one year. These two helper columns make that easy.

10. Click G1, type `Year`, and press Enter. In G2 type `=YEAR([@[Purchase Date]])` and press Enter.
11. Look at the Year column. Excel copied the currency format from the column next to it, so the year may look like $2,025.00. Select the Year column's data and choose Home > Number > Number Format > General.
12. Click H1, type `Month`, and press Enter. In H2 type `=TEXT([@[Purchase Date]],"mmm")` and press Enter. Set this column to General too.

> **Why it works**
> YEAR pulls the year number out of a date. TEXT turns a date into text using a format code; `"mmm"` means the three-letter month name. So 1/1/2025 becomes `2025` and `Jan`.

> **✓ Check your work**
> G2 = 2025 and H2 = Jan. Scroll to the bottom: G1201 = 2026 and H1201 = Nov.

Part 3: Build the Product List

13. Add a new sheet: click the + (New sheet) button next to the sheet tabs. Double-click the new tab, type `Product Summary`, and press Enter.
14. In A1 type `Grandma Madeline's Monthly Sales by Product`. In A4 type `Product`.
15. Copy the product names: go to Sales Data, click A2, press Ctrl+Shift+Down Arrow to select all 1,200 names, and press Ctrl+C.
16. Go to Product Summary and click A5. Paste only the names, without the table's colors and borders: choose Home > Clipboard > Paste (click the arrow under the Paste button) > Paste Values > Values. You can also right-click A5 and choose Paste Options > Values (the clipboard with 123).
17. Press Esc to turn off Copy mode.

> **Tip**
> Paste copies everything: the contents *and* the formatting, such as the table's banded shading. Paste Values copies only what you see in the cells, so the names arrive in plain cells you can format any way you like. Keyboard users can press Ctrl+Alt+V, then V, then Enter.
> After you copy, a moving dashed border (the "marching ants") surrounds the copied cells, and Excel stays in Copy mode until you press Esc. If you're doing a regular paste of everything, pressing Enter instead of Ctrl+V pastes *and* turns Copy mode off in one step.

> **✓ Check your work**
> A5 and the cells below it have no table shading, and the marching ants are gone from Sales Data.

18. Remove the duplicates: click A4, press Ctrl+Shift+Down Arrow, then choose Data > Data Tools > Remove Duplicates. Make sure My data has headers is checked and click OK.

> **✓ Check your work**
> Excel reports 1184 duplicate values found and removed; 16 unique values remain.
> Wait: Grandma sells 15 products, not 16!

19. Sort the list: click A5 and choose Data > Sort & Filter > Sort A to Z. Read down the list and find the problem.

> **Think about it**
> Two items look almost the same: Cinammon Rolls and Cinnamon Rolls. Someone misspelled the name when entering a few sales. To Excel, these are two different products, so the misspelled sales would be left out of the Cinnamon Rolls total. This is called *dirty data*, and it is very common in real exports.

20. Fix the data at its source. Go to Sales Data and press Ctrl+H (Home > Editing > Find & Select > Replace). In Find what type `Cinammon`, in Replace with type `Cinnamon`, and click Replace All.

> **✓ Check your work**
> Excel reports All done. We made 6 replacements.

21. Go back to Product Summary. Right-click the Cinammon Rolls cell, choose Delete, select Shift cells up, and click OK.

> **✓ Check your work**
> A5 = Apple Pie, A12 = Cinnamon Rolls, and A19 = Pepperoni Pizza. That's 15 products in A5:A19.

> **Tip**
> In Microsoft 365 you can create the same list with one formula: `=SORT(UNIQUE(Sales[Product Name]))`. It updates by itself when new products are added. Today we use Remove Duplicates because it works in every version of Excel.

Part 4: Headings and the Year Drop-Down

22. Click B4, type `Jan`, and press Enter. Click B4 again and drag the fill handle (the small square at the lower-right corner) to M4. AutoFill creates Feb through Dec.
23. In N4 type `Total`, and in O4 type `% of Total`.
24. In A2 type `Year:`. Click B2, then choose Data > Data Tools > Data Validation:
    a. On the Settings tab, set Allow to List. In Source type `2025,2026`.
    b. On the Input Message tab, type the title `Choose a year` and the message `Pick 2025 or 2026 to update the summary and chart.`
    c. Click OK.
25. Click the drop-down arrow beside B2 and choose 2025.

> **✓ Check your work**
> B2 shows 2025 and has a drop-down arrow. M4 reads Dec.

Part 5: The SUMIFS Formula

SUMIFS adds the numbers that meet *every* condition you give it. You need three conditions: the right product, the right year, and the right month.

Before you start: relative, absolute, and mixed references

You will fill one formula into all 180 cells of the grid. For that to work, each reference must know whether to move or stay put as it is filled. A `$` locks the part of a cell reference it sits in front of.

Reference type	Example	Copied one cell right	Copied one cell down
Relative	A5	B5 (moves)	A6 (moves)
Absolute	$A$5	$A$5 (stays)	$A$5 (stays)
Mixed: column locked	$A5	$A5 (stays)	$A6 (row moves)
Mixed: row locked	A$5	B$5 (column moves)	A$5 (stays)
Table column	Sales[Year]	Depends on how you fill (see below)	Sales[Year] (stays)

> **Tip**
> Press F4 while your cursor is in a cell reference to cycle through `A5` → `$A$5` → `A$5` → `$A5`. F4 works on cell references only, not table references.
> When you copy and paste a formula, Excel adjusts the cell references for each new cell, following the $ rules in the table above.

Table columns have one surprise. If you drag the fill handle to the right, `Sales[Year]` slides to the next table column, `Sales[Month]`, just like a relative reference. But if you Copy and Paste, table columns stay put. There's no F4 for table references, so instead of locking them, you'll build the formula once in B5 and then copy and paste it to the rest of the grid.

Think it in English first

Before you build the formula, say it in English: "Add up the Extended Price for the sales where the Product Name matches this row's product, the Year matches the Year cell, and the Month matches this column's month." Each part of that sentence becomes one part of the formula:

In English	In the formula	Why
Add up the Extended Price…	`Sales[Extended Price]`	The numbers to add
…where the Product Name matches this row's product…	`Sales[Product Name],$A5`	$ locks column A; the row moves down the list
…the Year matches the Year cell…	`Sales[Year],$B$2`	Fully locked: every cell looks at B2
…and the Month matches this column's month.	`Sales[Month],B$4`	$ locks row 4; the column moves across the months

Build the formula by pointing

26. Click B5 and format it as Accounting with no decimals. Use one of these methods:

- Ribbon buttons: click Home > Number > Accounting Number Format (the $ button), then click Home > Number > Decrease Decimal twice.
- Or, the dialog box: press Ctrl+1 (or choose Home > Number > Number Format > More Number Formats), click Accounting, set Decimal places to `0` and Symbol to $, and click OK.

> **Tip**
>
> Accounting lines up the dollar signs at the left edge of each cell and shows zeros as a dash (-), which makes a big grid of numbers easy to scan. Currency (in the Number Format drop-down box) puts the dollar sign right next to the number and shows zeros as $0.
>
> The Number group on the Home tab also has one-click buttons for other common formats:
>
> Percent Style (the % button, or Ctrl+Shift+%): shows 0.141 as 14%.
>
> Comma Style: like Accounting but without the dollar sign.
>
> Increase Decimal and Decrease Decimal: add or remove one decimal place each time you click. They change only what you see, not the stored value.

27. With B5 selected, type `=SUMIFS(` and build the rest by pointing:

a. Click the Sales Data tab, click F2, and press Ctrl+Shift+Down Arrow. Excel writes `Sales[Extended Price]`.
b. Type `,` then click A2 and press Ctrl+Shift+Down Arrow (`Sales[Product Name]`).
c. Type `,` then click the Product Summary tab, click A5, and press F4 three times to get `$A5`.
d. Type `,` then click the Sales Data tab, click G2, and press Ctrl+Shift+Down Arrow (`Sales[Year]`).
e. Type `,` then click the Product Summary tab, click B2, and press F4 once to get `$B$2`.
f. Type `,` then click the Sales Data tab, click H2, and press Ctrl+Shift+Down Arrow (`Sales[Month]`).

g. Type `,` then click the Product Summary tab, click B4, and press F4 twice to get `B$4`.
h. Type `)` to close the formula.

28. Press Enter.

Your formula in B5 should look like this:

```
=SUMIFS(Sales[Extended Price],Sales[Product Name],'Product
Summary'!$A5,Sales[Year],'Product Summary'!$B$2,Sales[Month],'Product
Summary'!B$4)
```

> **Tip**
> Start at the data, not the heading: click F2, not F1. If you start on the heading, Excel writes `Sales[[#All],[Extended Price]]`, which includes the heading row. The formula still works, but it's harder to read.
> Excel adds `'Product Summary'!` because you switched sheets while pointing. It's harmless. If you prefer, you can type `$A5`, `$B$2`, and `B$4` instead of clicking them.
> Select only B5 while you point. If a larger range is selected, Excel writes ordinary cell addresses such as `'Sales Data'!$F$2:$F$1201` instead of the table column names.

> **✓ Check your work**
> B5 = $ 60 (Apple Pie in January 2025).

29. Copy the formula to the whole grid: click B5 and press Ctrl+C. Then click B5, Shift+click M19, and press Enter to paste.

> **Tip**
> Copying B5 copies its Accounting format too, so the whole grid is formatted in one step. Pressing Enter pastes and turns off Copy mode.

> **✓ Check your work**
> M5 = $920 (Apple Pie in December)
> B13 = $847 (Classic Beef Lasagna in January)
> L5 = $1,320 (Apple Pie in November: Thanksgiving!)
> G5 shows a dash (-). Apple Pie had no sales in June 2025, and Accounting format shows zero as a dash.
> Click M5 and check the formula bar: it should still say Extended Price, Product Name, Year, and Month, with `$A5`, `$B$2`, and `M$4`.

> **Think about it**
> Why not just drag the fill handle? Try it once: click B5 and drag its fill handle one cell right, to C5. Look at C5 in the formula bar. The table columns slid over (Extended Price became Year, and so on). Press Ctrl+Z to undo.

Part 6: Totals and Percent of Total

30. In A20 type `Total`.
31. Select B5:N20, which includes the empty Total column and Total row. Choose Home > Editing > AutoSum (or press Alt+=). Excel adds row totals and column totals in one step.

> **✓ Check your work**
> N5 = $3,780 (Apple Pie for the year)
> B20 = $1,965 (all products in January)
> N20 = $26,829 (grand total for 2025)
> AutoSum copies the Accounting format from the cells it adds. If any totals show without a dollar sign, you'll fix them in step 33.

32. In O5 type `=N5/$N$20` and press Enter. Fill it down to O20.

> **Why it works**
> Every product must be divided by the same grand total, so `$N$20` is an absolute reference. Without the $ signs, the formula in O6 would divide by N21, which is empty, and you'd get #DIV/0!.

33. Format the numbers:
    a. Select B5:N20. If any cell is missing the Accounting format, click Home > Number > Accounting Number Format ($) and click Decrease Decimal twice (or use Ctrl+1 > Accounting, `0` decimal places).
    b. Select O5:O20. Click Home > Number > Percent Style (the % button), then Increase Decimal once. Or press Ctrl+1, choose Percentage, set Decimal places to `1`, and click OK.

> **✓ Check your work**
> O5 = 14.1%, O13 = 13.3%, and O20 = 100.0%.
> B20 displays $1,965. The real value is $1,964.50; the format rounds it for display.

Part 7: Sales by Category

Fifteen lines on one chart would look like spaghetti. Grandma's chart will show her six categories instead, so you need a second, smaller summary.

34. In A22 type this formula, which builds a title that changes with the year:

```
="Monthly Sales by Category, "&$B$2
```

> **✓ Check your work**
> A22 reads: Monthly Sales by Category, 2025

35. Copy the headings: select A4:O4, press Ctrl+C, click A24, and press Enter. Change A24 to `Category`.

36. Build the category list the same way you built the product list:
    a. Go to Sales Data, click B2, press Ctrl+Shift+Down Arrow, and press Ctrl+C.
    b. Go to Product Summary, click A25, choose Home > Clipboard > Paste > Paste Values > Values, and press Esc.
    c. Click A24 and press Ctrl+Shift+Down Arrow to select the Category column. Choose Data > Data Tools > Remove Duplicates.
    d. Excel shows a Remove Duplicates Warning asking whether to expand the selection. Choose Continue with the current selection and click Remove Duplicates. In the next dialog box, make sure My data has headers is checked, and click OK.
    e. Select A25:A30 and choose Data > Sort & Filter > Sort A to Z. If Excel shows a Sort Warning, choose Continue with the current selection and click Sort.

> **Why it works**
> This time the month headings sit right next to the Category column, in B24:O24. Excel notices data in the neighboring columns and asks whether you meant to include it. Expand the selection would compare entire rows from column A through O instead of just the category names, so always continue with only the column you selected.
> You didn't see this warning in Part 3 because the product list was built before you added the month headings.

> **✓ Check your work**
> Excel reports 1194 duplicate values found and removed; 6 unique values remain. A25:A30 lists: Breads & Yeast Doughs, Breakfast, Main Dish, Pies & Pastry, Pizza, Side Dish.

37. Click B25 and format it as Accounting with no decimals. Build the category version of the formula the same way, pointing to the Category column (B2 on Sales Data) instead of Product Name, and using `$A25` and `B$24`. Press Enter.

```
=SUMIFS(Sales[Extended Price],Sales[Category],'Product
Summary'!$A25,Sales[Year],'Product Summary'!$B$2,Sales[Month],'Product
Summary'!B$24)
```

38. Copy B25 (Ctrl+C), select B25:M30, and press Enter to paste.

> **Tip**
> Say it in English first: "Add up the Extended Price where the Category matches this row's category, the Year matches the Year cell, and the Month matches this column's month."

39. Type `Total` in A31. Select B25:N31 and press Alt+= for AutoSum.
40. In O25 type `=N25/$N$31` and fill down to O31. Format these cells like the product summary: Accounting with 0 decimals for B25:N31, and Percent Style plus one Increase Decimal for O25:O31.

> **✓ Check your work**
> N27 = $9,313 (Main Dish), 34.7% of sales
> N28 = $3,780 (Pies & Pastry)
> N31 = $26,829, exactly the same as N20.

> **Think about it**
> Why does Pies & Pastry equal the Apple Pie total exactly? (Hint: how many products are in that category?) And why must N31 match N20? Comparing two totals that should agree is one of the best ways to catch formula mistakes.

Part 8: Format with Grandma's Colors

Grandma Madeline's recipe database uses warm bakery colors. To use one, open a color drop-down, choose More Colors > Custom, and type the code in the Hex box.

Color	Hex	Use it for
Cocoa	5C3A1E	Heading rows (white bold text), title text
Cinnamon	B5652B	Accent text, chart line
Golden	F2B632	Thin borders
Butter	FCE9B8	Title band and Total rows
Cream	FFF8E7	Total and % columns, Year cell

41. Title: select A1:O1, choose Home > Alignment > Merge & Center drop-down > Merge Cells. Set the font to 20 pt Bold, Cocoa color, and fill with Butter. Set row 1's height to 36 (Home > Cells > Format > Row Height).
42. Headings: select A4:O4, hold Ctrl, and select A24:O24. Fill with Cocoa, then set the font to Bold and White.
43. Totals: select A20:O20, hold Ctrl, and select A31:O31. Fill with Butter and make them Bold.
44. Select N5:O19 and N25:O30 (use Ctrl) and fill with Cream.
45. Year cell: select B2 and fill with Cream. Make it Bold, 12 pt, and centered. Add a Golden All Borders border. Make A22 14 pt Bold Cocoa.
46. Column widths: set column A to 34, columns B:M to 10, N to 12, and O to 11 (Home > Cells > Format > Column Width).
47. Turn off gridlines: View > Show and uncheck Gridlines. Then click B5 and choose View > Window > Freeze Panes > Freeze Panes so product names and headings stay visible.

Part 9: The Category Line Chart

48. Select A24:M30: the Category heading, the month headings, and the six categories. Don't include the Total row or the Total and % columns.
49. Choose Insert > Charts > Insert Line or Area Chart > 2-D Line > Line.

> **✓ Check your work**
> The chart has six lines, one per category, and the months run along the bottom. If the months appear in the legend instead, click Chart Design > Data > Switch Row/Column.

50. Move and size the chart below the data:
    a. Point to the chart's outer edge until you see the four-headed arrow. Hold Alt and drag the chart until its upper-left corner snaps to the upper-left corner of A33.
    b. Hold Alt while you drag the lower-right handle until the chart's right edge lines up with the right edge of column O.

> **Tip**
> Holding Alt while you move or resize a chart makes it snap to the cell gridlines, so its edges line up exactly with the columns and rows instead of stopping partway into a cell. The chart then lines up cleanly with the table above it.

51. Link the title to A22: click the chart title once to select it. Click in the formula bar, type =, click A22, and press Enter.
52. Move the legend: click the Chart Elements (+) button beside the chart, point to Legend, click the arrow, and choose Right.
53. Format the vertical axis: double-click the dollar amounts on the left, and in Format Axis > Number choose Currency with 0 decimal places.
54. Make the lines easier to see: click each line, choose Format > Shape Styles > Shape Outline > Weight > 2¼ pt, and give each line one of Grandma's colors (Cocoa, Cinnamon, Golden) or another color you like.

> **✓ Check your work**
> The chart title reads "Monthly Sales by Category, 2025."
> The Pies & Pastry line climbs sharply in November. The Pizza line is highest in summer.

Part 10: Test Drive: Switch to 2026

55. Click B2, open the drop-down, and choose 2026.

> **✓ Check your work**
> N20 = $27,416 (the 2026 grand total)
> N5 = $1,518 (Apple Pie, 2026)
> L20 = $3,761 (November 2026)
> Every cell in the Dec column is $0, and the chart title now reads "Monthly Sales by Category, 2026."

> **Think about it**
> Why is December 2026 all zeros? (Look at the last date in the data.) What does that do to the chart lines, and what would you tell Grandma so she doesn't think December sales collapsed? (The extra credit at the end of this exercise shows how to make the lines stop at November.)
> Apple Pie sold $3,780 in 2025 but only $1,518 in 2026. What questions would you ask Grandma about that?

56. Switch B2 back to 2025.

Part 11: Finishing Touches

57. Set up printing for Product Summary: Page Layout > Page Setup > Orientation > Landscape, then Page Layout > Scale to Fit > Width > 1 page.
58. Check it with File > Print, then click A1 and save (Ctrl+S).

Final Checklist

- The data is a Table named Sales with Extended Price, Year, and Month calculated columns
- The misspelled Cinammon Rolls entries are fixed (6 replacements)
- Product Summary lists 15 products and 6 categories in alphabetical order
- One SUMIFS formula, copied and pasted to fill each grid, using $A5 / B$4 mixed references and $B$2
- Row totals, column totals, and percent of total are correct; both grand totals match
- B2 has a 2025/2026 drop-down that changes every number, the title, and the chart
- The line chart has six categories, a linked title, and a legend on the right
- The sheet is formatted in Grandma's colors and prints on one page wide

Extra Credit: Count Orders per Year

59. Add a column that counts orders instead of dollars. In P4 type `Orders`. In P5 use COUNTIFS to count the 2025 sales rows for each product: `=COUNTIFS(Sales[Product Name],$A5,Sales[Year],$B$2)`, and fill it down.

> ✓ **Check your work**
> P20 (the sum of column P) = 629 orders in 2025, or 571 when B2 is 2026.

60. Replace your Remove Duplicates product list with the formula `=SORT(UNIQUE(Sales[Product Name]))` in A5 (Microsoft 365 only). What happens if you misspell a product in the data now?

Extra Credit: Make December 2026 Disappear from the Chart

When B2 is 2026, every line on the chart drops to $0 in December, because the data stops on November 25. You might expect Chart Design > Data > Select Data > Hidden and Empty Cells > Gaps to fix this, but it doesn't. Gaps only skips cells that are truly *empty*, and the December cells aren't empty: each one holds a formula that returns 0.

What the cell holds	How a line chart plots it
A truly empty cell	Follows the Hidden and Empty Cells setting (Gaps, Zero, or Connect)
`0`	Plotted as $0, so the line drops to the bottom
`""` (empty text from a formula)	Also plotted as 0
`#N/A` (from the NA function)	Skipped, so the line simply stops

A formula can't return an empty cell, but it *can* return #N/A. You'll make the category formulas return #N/A for any month that has no sales at all, then fix the totals so the errors don't spread. Work on the category summary only, since that is what the chart uses.

61. Click B2 and choose 2026.

62. Click B25, type this formula, and press Enter. Then copy B25 (Ctrl+C), select B25:M30, and press Enter to paste it over all 72 cells.

```
=IF(COUNTIFS(Sales[Year],$B$2,Sales[Month],B$24)=0,NA(),SUMIFS(Sales[Extended
Price],Sales[Category],$A25,Sales[Year],$B$2,Sales[Month],B$24))
```

> **Why it works**
>
> COUNTIFS counts how many sales rows exist for this year and month, in any category. If there are none, the month hasn't happened yet, so `NA()` returns #N/A. Otherwise the formula returns the same SUMIFS total as before.
>
> Why not just test whether the SUMIFS total is 0? Because a real month can have $0 for one category. In 2025, Pies & Pastry sold nothing in June, and that $0 should still appear on the chart. COUNTIFS asks a better question: "Did the store have any sales this month?"

> **✓ Check your work**
>
> M25:M30 (Dec) show #N/A. Every other month shows dollar amounts.
>
> Notice that the Total column and Total row now show #N/A too. Any SUM that includes an error returns that error.

63. Fix the totals with AGGREGATE, which can skip errors:
    a. In N25 type `=AGGREGATE(9,6,B25:M25)` and fill it down to N30.
    b. In B31 type `=AGGREGATE(9,6,B25:B30)` and fill it right to N31.

> **Why it works**
>
> In AGGREGATE, the first number picks the calculation (`9` = SUM) and the second picks what to ignore (`6` = error values). So `AGGREGATE(9,6,…)` means "add these up, skipping any errors."

> **✓ Check your work**
>
> N31 = $27,416, the same 2026 total as N20. M31 (Dec) shows $0, and the % column shows 100.0% in O31.

64. Turn on Gaps for #N/A: click the chart and choose Chart Design > Data > Select Data. Click Hidden and Empty Cells, select Gaps, check Show #N/A as an empty cell, and click OK twice.

> **✓ Check your work**
>
> All six lines now end at November. Nothing drops to $0 in December.

> **Tip**
>
> Older versions of Excel don't have the Show #N/A as an empty cell checkbox. They skip #N/A automatically, so the lines still end at November.

65. Optional: hide the #N/A text in the table. Select B25:M30 and choose Home > Styles > Conditional Formatting > New Rule. Choose Format only cells that contain, change Cell Value to Errors, click Format, set the font Color to White, and click OK twice.

66. Switch B2 back to 2025.

> **✓ Check your work**
>
> Every month in 2025 had sales, so the table looks exactly as it did before: N31 = $26,829. The Pies & Pastry line still dips to $0 in June. That's a real $0 month, and your formula correctly kept it.

Grandma Madeline's Monthly Sales by Product

Year: 2025

Product	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% of Total	Orders
Apple Pie	$ 60	$ 180	$ 700	$ 100	$ 80	$ -	$ 40	$ 100	$ 20	$ 260	$ 1,320	$ 920	$ 3,780	14.1%	52
Baked Macaroni and Cheese	$ 149	$ 215	$ 50	$ 17	$ 17	$ 165	$ 17	$ 17	$ 182	$ 83	$ 545	$ 198	$ 1,650	6.2%	46
BBQ Chicken Pizza	$ -	$ 108	$ -	$ 144	$ 36	$ 18	$ 198	$ 144	$ 126	$ -	$ 234	$ 90	$ 1,098	4.1%	26
Blueberry Streusel Muffins	$ 131	$ 131	$ 116	$ 189	$ 232	$ 58	$ 348	$ 102	$ 73	$ 160	$ 87	$ 348	$ 1,972	7.4%	62
Breakfast Burritos	$ 29	$ 29	$ 145	$ 145	$ 160	$ 44	$ 102	$ 44	$ 87	$ 232	$ 145	$ 87	$ 1,247	4.6%	36
Buttermilk Pancakes	$ 45	$ 72	$ 9	$ 54	$ 36	$ 54	$ 126	$ 171	$ 9	$ 90	$ 9	$ 54	$ 729	2.7%	36
Chicken Pot Pie	$ 102	$ 332	$ 204	$ 204	$ 51	$ 153	$ 102	$ 230	$ 281	$ 179	$ 128	$ 332	$ 2,295	8.6%	36
Cinnamon Rolls	$ 149	$ 149	$ 281	$ 281	$ 50	$ 50	$ -	$ 215	$ 149	$ 182	$ 215	$ 363	$ 2,079	7.7%	53
Classic Beef Lasagna	$ 847	$ 616	$ 154	$ -	$ 231	$ 193	$ 154	$ -	$ 154	$ 578	$ 270	$ 385	$ 3,581	13.3%	36
Garlic Mashed Potatoes	$ 8	$ 48	$ 72	$ 88	$ 16	$ 40	$ -	$ 8	$ 48	$ 56	$ 264	$ 240	$ 888	3.3%	36
Grandma's Homemade White Bread	$ 110	$ 11	$ 44	$ 44	$ 22	$ 39	$ 22	$ 44	$ 99	$ 187	$ 77	$ 143	$ 842	3.1%	52
Green Bean Casserole	$ -	$ 11	$ 22	$ 33	$ 44	$ 44	$ 22	$ 44	$ 11	$ 88	$ 132	$ 209	$ 660	2.5%	30
Hearty Beef Stew	$ 55	$ 28	$ 110	$ 110	$ 193	$ 55	$ 55	$ 138	$ 165	$ 358	$ 303	$ 220	$ 1,788	6.7%	27
Margherita Pizza	$ 116	$ 131	$ 247	$ 160	$ 261	$ 58	$ 15	$ 276	$ 58	$ 261	$ 131	$ 102	$ 1,813	6.8%	48
Pepperoni Pizza	$ 165	$ 264	$ 264	$ 132	$ 165	$ 594	$ 83	$ 33	$ 198	$ 248	$ 149	$ 116	$ 2,409	9.0%	53
Total	**$ 1,965**	**$ 2,322**	**$ 2,417**	**$ 1,699**	**$ 1,592**	**$ 1,563**	**$ 1,282**	**$ 1,563**	**$ 1,658**	**$ 2,959**	**$ 4,006**	**$ 3,806**	**$ 26,829**	**100.0%**	**629**

Monthly Sales by Category, 2025

Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	% of Total
Breads & Yeast Doughs	$ 259	$ 160	$ 325	$ 325	$ 72	$ 88	$ 22	$ 259	$ 248	$ 369	$ 292	$ 506	$ 2,921	10.9%
Breakfast	$ 205	$ 232	$ 270	$ 388	$ 428	$ 156	$ 576	$ 316	$ 169	$ 482	$ 241	$ 489	$ 3,948	14.7%
Main Dish	$ 1,153	$ 1,190	$ 518	$ 331	$ 491	$ 566	$ 328	$ 384	$ 781	$ 1,196	$ 1,244	$ 1,135	$ 9,313	34.7%
Pies & Pastry	$ 60	$ 180	$ 700	$ 100	$ 80	$ -	$ 40	$ 100	$ 20	$ 260	$ 1,320	$ 920	$ 3,780	14.1%
Pizza	$ 281	$ 503	$ 511	$ 436	$ 462	$ 670	$ 295	$ 453	$ 382	$ 509	$ 513	$ 307	$ 5,320	19.8%
Side Dish	$ 8	$ 59	$ 94	$ 121	$ 60	$ 84	$ 22	$ 52	$ 59	$ 144	$ 396	$ 449	$ 1,548	5.8%
Total	**$ 1,965**	**$ 2,322**	**$ 2,417**	**$ 1,699**	**$ 1,592**	**$ 1,563**	**$ 1,282**	**$ 1,563**	**$ 1,658**	**$ 2,959**	**$ 4,006**	**$ 3,806**	**$ 26,829**	**100.0%**

