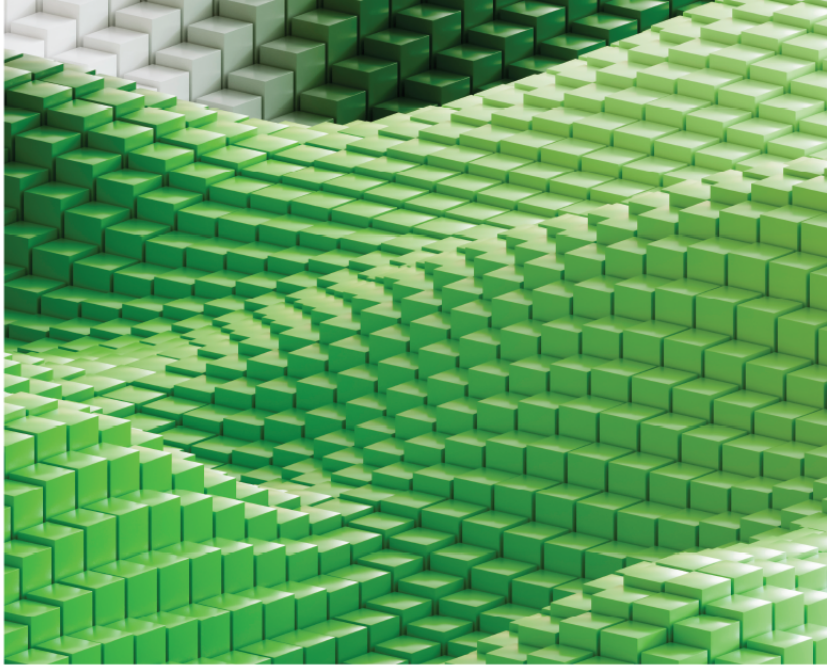


Spreadsheet
Workbooks,
Formulas, P
Functions,
Evaluations
Forecasts,
Optimization
Data Visual



	A	B	C	D
1	Staff development			
2				
3				
4	Employee	Factory 1	Factory 2	Factor
5	Worker	1200	1300	11
6	Total	2000	1900	20
7		=SUM(	3200	31
8	Employee			

Excel

The Comprehensive Guide

Helmut Vonhoegen



Rheinwerk
Computing

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Chapter 2

The Structure of Spreadsheets

This chapter begins by explaining how to best define a table's structure to solve a specific problem. As an example, it uses an income and expense statement that tracks your finances. Next, this chapter teaches you how to enter your data most efficiently, and finally, it covers all the basic operations that are essential for working with calculation models.

2.1 Planning and Designing Calculation Models

Programs like Excel tend to tempt you to dive straight in and add labels and data the moment you open them. All too often, the result is a worksheet that, on closer inspection, just doesn't hold up. Although correcting these problems is fairly easy in Excel, it's usually more effective to clarify a few things beforehand. You can do this on a separate sheet in the workbook that's used to document the calculation model.

2.1.1 What to Consider When Building Tables

Before you enter data into a table, it's important to consider several questions, such as these:

- What is the table's purpose?
- What information should it provide to support which decisions?
- What data is needed to fulfill that purpose?
- Which information should be emphasized?
- Who will enter the data, and who will analyze it?
- Which data will be entered manually, which data will come from existing sources, and are there links to other tables?
- What time periods, regions, items, or people does the table cover?
- How long is the data valid, which data is static, and which data changes—and how often?
- What level of accuracy is required, and what is realistically achievable?
- What calculations are planned?
- How is the accuracy of the data and calculations ensured?

- Which data will be analyzed graphically?
- How are the data published, in what format, and for whom?

Tables are generally used to present specific facts, relationships, and trends in an organized way. A table should include all the information necessary for it to achieve its purpose. For example, our income-expense statement should list all income and expense items to accurately represent the current situation. Unnecessary data should be excluded from a table as it reduces clarity. Often, it's better to spread data across multiple tables than to cram all the material on a topic into one.

On the income and expenses sheet, for example, you could list the amounts for each individual insurance policy separately—but that would actually make things less clear. Therefore, it's smarter to use a dedicated worksheet for insurance costs, and to help you access that sheet quickly when you need to, you can add a hyperlink from one table to the other.

2.1.2 Labels, Values, and Calculation Rules

Usually, a table's content consists of three main parts:

- Labels for the columns and rows used
- Values
- Calculation rules (formulas)

These often reflect three stages in developing a table. First, you define the table's structure with labels, then, you enter the values (the numerical data for calculations), and finally, you create the formulas. If you have forms you want to fill out later, you can enter the formulas in advance. It's also often helpful to test formulas with sample values that you can delete later.

Labeling Rules

You should follow these guidelines for table labels to ensure clarity:

- The temporal, spatial, factual, or personal scope should be clearly identifiable.
- Keep column labels as brief as possible to display more data columns in the window. Place related items next to each other, and always position row sums either before or after the value columns for consistency.
- Use uniform row heights for row labels to avoid unintentionally highlighting items.
- When possible, let large tables expand vertically rather than horizontally. Use column labels with fewer items.
- Arrange values vertically when calculating sums, and calculate row sums by using a manageable number of values whenever possible.

2.1.3 Defining the Structure of an Income and Expense Table

The best structure to use when creating a table usually depends on the key characteristics of the data you'll be entering into the table.

Labels

A two-part table works well for an income and expense statement: income is listed on one side and expenses on the other. Using indents helps distinguish main labels from those for specific income types.

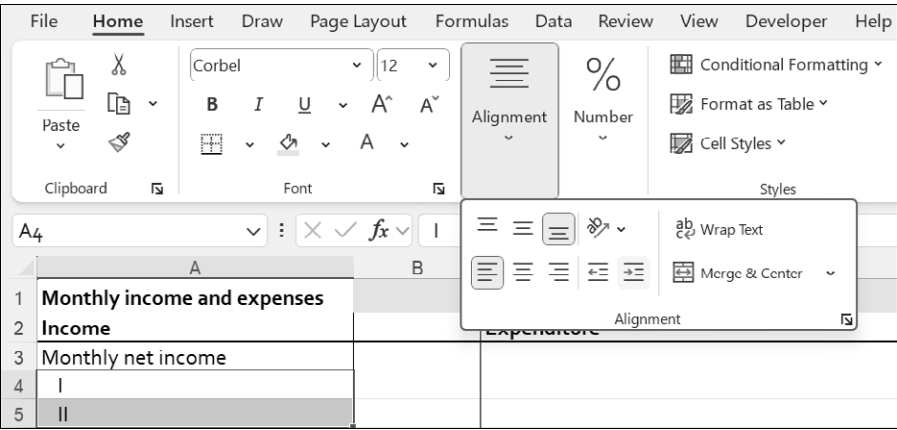


Figure 2.1 Labels for Income, Organized with Indents

Classifying expenses is generally more challenging than classifying income because you need to find categories that clearly assign each expense amount. The example solution in Figure 2.2 is just a suggestion.

	A	B	C	D
1	Monthly income and expenses			Jan-25
2	Income		Expenditure	
3	Monthly net income		Rent and other housing expenses	
4	I		Expenses for car	
5	II		Public transport expenses	
6			Insurance premiums	
7			Contractually fixed savings rates	
8			Interest and repayment rates	
9			Food	
10	Other regular income		Expenses for the children	
11	Capital gains		Expenses for private purchases	
12			Expenses for information, education, etc.	
13			Expenditure on health and sports	
14			Expenses for entertainment	
15			Donate	
16			Other expenditure	
17	Total		Total	

Figure 2.2 Fully Labeled Income and Expenses Table

Setting the Calculation Rule

This table requires minimal calculation. You only need to sum the two columns for income and expenses, so after entering the labels, you can input the formulas as follows:

1. Select cell B18.
2. Click the **AutoSum** icon on the **Home** tab in the **Editing** group. Because Excel can't automatically detect the range due to empty cells, select the range from B3 to B17 and press **Enter** to confirm the formula.
3. Repeat the same steps for cell D18.

Entering the Values

Since all values are in euros, apply the currency format to the ranges B3:B18 and D3:D18. Then, if you save the table as a template, you can use the form anytime to calculate your monthly expenses.

If you want to perform this calculation every month, simply copy the first sheet each time a month ends and enter the current month into cell D1. To do this, open the sheet tab's context menu, select **Move or Copy**, select **Create a copy**, and choose **(at end) Before sheet**. On sheets that are updated monthly, label the tabs with the month names by double-clicking the tabs and typing the month names.

	A	B	C	D
1	Monthly income and expenses			Jan-25
2	Income		Expenditure	
3	Monthly net income		Rent and other housing expenses	\$3,000.00
4	I	\$5,000.00	Expenses for car	\$500.00
5	II	\$4,000.00	Public transport expenses	\$250.00
6			Insurance premiums	\$600.00
7			Contractually fixed savings rates	\$400.00
8			Interest and repayment rates	\$340.00
9			Food	\$1,200.00
10	Other regular income		Expenses for the children	\$500.00
11	Capital gains	\$400.00	Expenses for private purchases	\$500.00
12			Expenses for information, education, etc.	\$400.00
13			Expenditure on health and sports	\$1,000.00
14			Expenses for entertainment	\$300.00
15			Donate	\$100.00
16			Other expenditure	\$100.00
17	Total	\$9,400.00	Total	\$9,190.00

Figure 2.3 Completed Income and Expense Statement

2.2 Navigation and Selection

In Excel, whether you're entering data and formulas or formatting and editing cells, cell ranges, and objects, you should always select first and then act. Selecting cells, cell

ranges, sheets, or other objects is one of the most common tasks you'll perform, and you'll save time by mastering the selection methods and choosing the most effective one for each situation. This is especially important when you're working on large tables, where only a small portion is visible on screen.

If you're using a computer, you can select by using either a mouse or keyboard commands—and which option is better depends on the situation. It's often easiest to select the first cell by clicking it and to then use the arrow keys to move through neighboring cells. If you're using a touchscreen, then finger gestures replace the mouse; or if your device supports it, you can use a stylus instead of your fingers. Finally, if you're using a tablet, you might use an on-screen keyboard instead of a physical one. In the following sections, we mainly describe the classic mouse-and-keyboard operation, but we also include touch mode instructions where needed. If you're using an on-screen keyboard, keep in mind that you can't combine finger presses with key presses directly. In many cases, you can tap a key first in **Touch input** mode and then perform an action with your finger, but be aware that not all mouse and keyboard functions have exact equivalents in this mode.

2.2.1 Sheet Selection and Group Editing

Imagine you've completed the income and expense report from the last section for several months. To view May's data, you can just click or tap the tab of the corresponding sheet, and you can also switch sheets by using **Ctrl** + **Page ↓** or **Ctrl** + **Page ↑** on the keyboard.

If you need to have multiple sheets share the same formatting or print them together, you can select them all at once. If the sheets are adjacent, click the first one, hold down the **Shift** key, and then click the last tab in the group. To add or remove individual sheets from the group, use **Ctrl** and click or tap the tab. However, you cannot remove the currently active sheet—which is marked by an underline and white background—from the group. The tabs of the other sheets in the selected group also have a white background, and the workbook title displays the word **Group**.

You can also use this group mode to, for example, add a common title row to all sheets at once. Any entry in a cell on a sheet within a group appears in the same position on all other sheets in that group, and clicking or tapping a tab outside the group cancels the multiple selection. To select all sheets at once, choose **Select All Sheets** from the tab's context menu. To cancel this selection, choose the **Ungroup** option.

2.2.2 Selecting Cells and Cell Ranges

If a cell is visible in the window, you can select it with a mouse click or a tap with your finger or stylus. Selecting cells far from the current cell pointer takes a bit more effort, so you'll need to use the scroll bars to move the screen area and then select the cell that appears.

Dragging the vertical scroll bar moves the screen area row by row, and dragging the horizontal scroll bar works the same for columns. Holding down **Shift** speeds up the scrolling, and clicking or tapping the arrows on the scroll bar moves the window by one row or column. Holding down the arrows causes continuous scrolling, and clicking or tapping above or below the scroll bar shifts the screen area by about the size of the current window.

On a touchscreen, you can also adjust the screen area by sliding the grid horizontally or vertically with your finger. It's even faster if you swipe in the opposite direction within the grid.

Selecting Cell Ranges in a Sheet

To select cell ranges, drag over the desired area while holding down the left mouse button. The direction you drag in doesn't matter, and the cell where you start dragging is always the active cell of the range. To extend the range beyond the visible area, drag past the window edge until the desired table area appears and then release the mouse button once you reach the correct position. A counter at the moving edge helps you accurately define the range, and if you go too far, just drag a little in the opposite direction.

When you're selecting a large area with the mouse, it's usually more effective to use a different method. Click the first corner cell of the area and then hold down the **Shift** key while clicking the opposite corner cell. If the selection isn't quite right, click the correct spot again while holding down the **Shift** key. Using this method is especially helpful when you need to scroll the view to make the last cell visible. If you select an incorrect area, click a single cell to cancel the selection. However, running a command that affects the area doesn't cancel it, so you can use the same selection for multiple commands.

Another way is to select the first corner cell, press **F8** (which will make the status bar display **Extend Selection**), and then select the opposite corner cell. Then, press **F8** again to exit extension mode.

To select a range using **Touch input** mode, tap the top-left corner cell and then drag the round handles that appear in the direction you want. Even in **Touch input** mode, you can use **F8** as described.

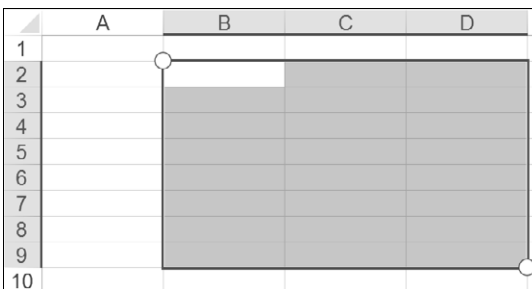


Figure 2.4 Range Selected by Dragging Round Handles

Selecting Rows and Columns

You can select an entire column or row by simply clicking or tapping its header. To select multiple rows or columns at once, drag the mouse over the row or column headers. The number of selected items is always shown for easy reference.

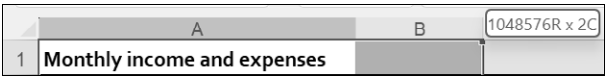


Figure 2.5 Selecting Two Income Columns

In **Touch input** mode, drag the round handles that appear on both sides of the selected column. To select the entire table at once, click or tap the **Select All** box in the upper-left corner where the column and row headers meet.

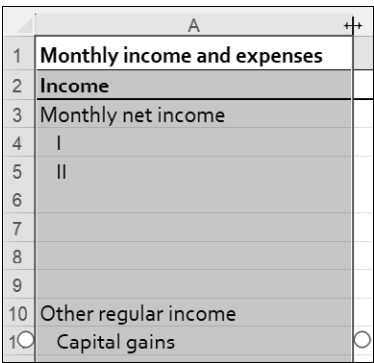


Figure 2.6 Multicolumn Range with Round Handles on Touchscreen

Multiselection

Although a range must always be rectangular, Excel lets you combine multiple rectangles into a multiselection. This allows you to select nonadjacent cells, for example, to format them consistently. The areas can even overlap.

For example, to highlight the two number columns in the income-expense table with different colors, follow these steps:

1. Define the first area in column B by dragging as usual.
2. To include the expense values, hold down the **Ctrl** key while dragging in column D.

The active cell is always in the most recently selected area (see Figure 2.7).

To include entire columns or rows in a multiple selection, hold down **Ctrl** while clicking the column or row headers.

You can also use the function key method. After selecting the first area, press **Shift + F8**, select the start of the second area, press **F8**, and then click or tap the end of the second area. Press **F8** again to finish the multiple selection.

	A	B	C	D
1	Monthly income and expenses			Jan-25
2	Income		Expenditure	
3	Monthly net income		Rent and other housing expenses	\$3,000.00
4	I	\$5,000.00	Expenses for car	\$500.00
5	II	\$4,000.00	Public transport expenses	\$250.00
6			Insurance premiums	\$600.00
7			Contractually fixed savings rates	\$400.00
8			Interest and repayment rates	\$340.00
9			Food	\$1,200.00
10	Other regular income		Expenses for the children	\$500.00
11	Capital gains	\$400.00	Expenses for private purchases	\$500.00
12			Expenses for information, education, etc.	\$400.00
13			Expenditure on health and sports	\$1,000.00
14			Expenses for entertainment	\$300.00
15			Donate	\$100.00
16			Other expenditure	\$100.00
17	Total	\$9,400.00	Total	\$9,190.00

Figure 2.7 Two Selected Number Columns

To remove individual cells or cell ranges from a multiple selection, you can hold down **Ctrl** and click or tap the cells you want to exclude, or you can drag over the cell range. This method doesn't work with a finger on a touchscreen.

Navigating within a Range

Sometimes, it's better to select a cell range rather than individual cells when entering data. Keep in mind that you can't use arrow keys to finish data entry because they cancel the range selection, and you also can't use the mouse inside a selected range since clicking will cancel the selection. The following key functions apply:

Key Combinations	Effects
Enter	Move cell down
Shift + Enter	Move cell up
Tab	Move cell right
Shift + Tab	Move cell left

All key functions in this area work cyclically, meaning after the last cell at the bottom right, the selection returns to the first cell at the top left.

Using Data Blocks

Data blocks are closed cell ranges filled with data, and when multiple tables are set up as data blocks in a worksheet, additional navigation options become available.

If you double-click the border of an active cell on one side, the selection jumps in that direction—either to the end of the data block the cell belongs to or to just before the next data block in that direction. This is helpful when tables are arranged side by side or above each other, separated by empty columns or rows. In very wide tables, it lets you quickly jump from the row label on the far left to a column with the row sums on the far right. When combined with the **[Shift]** key, double-clicking the selection frame extends the range to the end of the block or to just before the next one. You can quickly select a long column filled entirely with data and no empty cells this way.

Click the top cell, then double-click the bottom edge of the selection while holding the **[Shift]** key. To include adjacent columns, double-click the right edge of the selection while holding the **[Shift]** key.

	A	B	C	D	E	F	G	H
1								
2		Data block 1				Data block 2		
3				1. Jump	2. Jump			3. Jump
4		100 m Results				200 m Results		
5		Day	Rank	Time		Day	Rank	Time
6		6/10/2015	3	12.34		6/10/2015	2	22.83
7		6/11/2015	2	12.45		6/11/2015	4	23.03
8		6/12/2015	4	12.23		6/12/2015	1	22.63
9		6/13/2015	1	12.10		6/13/2015	2	22.39

Figure 2.8 Navigating Within Data Blocks

2.2.3 Moving and Selecting with the Keyboard

Use the **[←]**, **[↓]**, **[↑]**, and **[→]** keys to select cells with the keyboard. Each keystroke moves the cell pointer one column or row, and holding down an arrow key scrolls the view continuously in that direction. For larger moves, keyboard shortcuts are more efficient.

Navigating within a Table

There are many keys and keyboard shortcuts you can use to make small and large movements within the cell grid. There are also some handy methods to make working with large workbooks easier.

Key Combinations	Effects
[→] or [Tab]	Move one column to the right.
[←] or [Shift] + [Tab]	Move one column to the left.
[↓]	Move down one row.
[↑]	Move up one row.

Key Combinations	Effects
Home	Jump to the beginning of the row.
Ctrl + Home	Jump to the beginning of the table.
Ctrl + End	Jump to the end of the used table area.
Page ↓	Move down one window.
Page ↑	Move up one window.
Ctrl + Page ↓	Jump to the next sheet.
Ctrl + Page ↑	Jump to the previous sheet.
Ctrl + Backspace	Make the active cell visible again if the view was previously moved with a scrollbar or the scroll key.
Ctrl + ↑	Jump up in the column to the start of a data block or the end of the next one.
Ctrl + ↓	Jump down in the column to the end of a data block or the start of the next one.
Ctrl + ←	Jump left in the row to the start of a data block or the end of the next one.
Ctrl + →	Jump right in the row to the end of a data block or the start of the next one.



If Scrolling in the Sheet Feels Slow

If your table contains many charts and graphic objects, navigating it can become sluggish. You can speed up scrolling by going to **Options • Advanced • Display options for this workbook** and selecting **For objects, show: Nothing (hide objects)**. You can speed it up even more by pressing **Ctrl** + **6**.

Range Selection

Many keyboard shortcuts can simplify selecting cell ranges.

Key Combinations	Effects
Shift + ← ↓ ↑ →	Extend the selection by one row or column in the direction of the arrow key.
Shift + Home	Extend the selection to the start of the row.
Shift + Spacebar	Select the entire row.

Key Combinations	Effects
Ctrl + Spacebar	Select the entire column.
Ctrl + Shift + Home	Extend selection to the start of the table.
Ctrl + Shift + End	Extend selection to the end of the table.
Ctrl + Shift + Spacebar	Select the entire table.
Shift + Page ↓	Extend selection down by one screen.
Shift + Page ↑	Extend selection up by one screen.
Ctrl + Shift + ← ↓ ↑ →	Extend selection to the end or start of the block in the direction of the arrow key or to the start or end of the next data block.
Ctrl + + *	Select the entire data block containing the active cell. Instead of the key combination, you can use the button with four arrows (Select Current Region), which you can add to the Quick Access Toolbar.
Shift + Backspace	Reduce the selection to the active cell.
Ctrl + A	Select the entire worksheet. If the cell pointer is inside a cell range, then that range is selected; pressing the shortcut again selects the whole sheet. In the formula bar, this selects all content.

When selecting with your keyboard, you can also pick the first corner cell, press **F8**, select the last corner cell, and press **F8** again.

Keys in End Mode

Like keyboard shortcuts for moving and selecting data blocks, some keys work when the **End** key activates **End mode**, which appears in the status bar. You don't need to hold down the **End** key, and the mode deactivates immediately afterward.

Key Combinations	Effects
End	Toggle End mode on or off.
End + ← ↓ ↑ →	Jump to the start or end of a data block in a column or row.
End + Home	Jump to the end of the table.
End + Enter	Jump to the last cell in the current row.
End + Shift + ← ↓ ↑ →	Extend the selection to the start or end of a data block in the direction of the arrow key.

Key Combinations	Effects
End + Shift + Home	Extend selection to the end of the table.
End + Shift + Enter	Extend the selection to the last cell in the current row.

The table end is the cell where the lowest row and the rightmost column that contain values or formatting intersect.

Keys in Scroll Mode

Pressing the scroll key toggles scroll lock on and off. In this mode—which is indicated by **Scroll** in the status bar—the keys shown in the following table perform functions that are different from their usual ones.

Key Combinations	Effects
← ↓ ↑ →	Move the window view by one column or row in the direction of the arrow key without changing the active cell's position.
Home	Move to the top-left cell in the window.
End	Move to the bottom-right cell in the window.
Shift + Home	Extend the selection to the top-left cell in the window.
Shift + End	Extend the selection to the bottom-right cell in the window.

Selecting Multiple Ranges by Using the Keyboard

To select multiple table ranges with the keyboard, select the first range as usual by using **Shift** and the arrow keys. Before adding another range, you must freeze the current selection so the next range doesn't cancel it. You do this by pressing **Shift** + **F8**, after which, the status bar will show the message **Add or remove section**.

Selecting with the Name Box

If you know the address of a distant cell you want to select, you can use the name box that's located in the formula bar. For example, to jump to cell F400 by using the name box, just enter F400 and press **Enter**. You can also enter a range like F200:G400 to select that range, and by entering addresses like F200:G400; H200:I400, you can select nonadjacent ranges.

If a range already has a name, simply click or tap it in the name list to select it. The list shows names from the active sheet and the entire workbook. You can also use the name box to name a range. To do this, select the range, click or tap the arrow next to the name box, enter the name, and press **Enter**. Chapter 3 covers named ranges in detail.

The Go To Command and the F5 Key

You can use **Home • Editing • Find and Select • Go To** as an alternative to the name box. Excel provides a small dialog box where you can enter the address of the cell to activate under **Lookup**, and you can also specify cell addresses in other open workbooks by prefixing the full file name in square brackets.

Instead of a cell address, you can select the name of a cell or range if the target cell or its range has been named beforehand. When you use the command, Excel places the address of the last active cell—meaning the jump address—at the top of the name list. This makes it easy for you to return quickly to that spot, which you do by simply pressing **[F5]** and **[Enter]**. This lets you easily jump back and forth between two distant cell ranges.

You can also use the **Go To** command to select a range. For example, you can enter A1:Z300 under **Reference** to select that range. You can also place the cell pointer on A1, press **[F5]**, and then confirm the Z300 entry by pressing **[Shift]+OK** or **[Shift]+[Enter]**. You can also enter multiple ranges here by separating each range address with a semicolon.

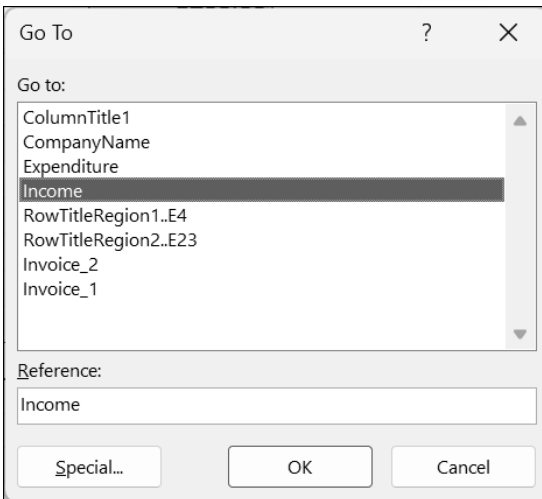


Figure 2.9 Go To Dialog Box

2.2.4 Selecting Specific Content

Sometimes, you need to select cells that share certain properties. For example, if you need to find empty cells in a large table because their values are missing, you can select the entire range and then open the **Go To** dialog box by pressing **[F5]**. Clicking the **Special** button opens a dialog box where you can select the **Blanks** option to highlight all empty cells in the range, and after you confirm this, the table will highlight all empty cells as a multiselection. You can easily enter missing data by pressing **[Tab]** after each entry, and the cell pointer moves to the next empty cell after each entry you make.

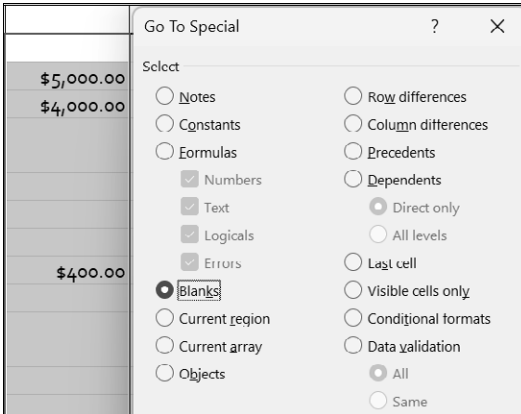


Figure 2.10 Selecting Blank Cells Using Select Special Dialog Box

This feature lets you search the entire table, selected sheets, or a marked range by using various criteria, but you can only apply one criterion at a time. You can select from the following criteria:

- **Comments**
- **Constants**
- **Formulas**

For constants or formulas, you can select from four data types: **Numbers**, **Text**, **Logicals**, and **Errors**.

- **Blanks**

This highlights empty cells within the used worksheet area.

- **Current region**

This highlights the cell block containing the current cell.

- **Current array**

This highlights the entire array containing the current cell. This option no longer applies to cell ranges that contain a dynamic array, so to highlight such a cell range, use the **Current region** option instead.

- **Objects**

This highlights all objects in the file, if they haven't been protected using **Review • Protect • Protect Sheet** and the **Edit Objects** option is unchecked.

- **Row differences**

This identifies cells in a selected range of data rows whose content differs from the cell in the comparison column for the same row. The comparison column is where you place the active cell, and this function lets you compare columns.

- **Column differences**

This identifies cells in a selected range of data columns whose content differs from the cell in the comparison row for the same column.

- **Precedents**

This highlights cells referenced by the selected formulas. You can extend the search to all levels or limit it to directly preceding cells.

- **Dependents**

This highlights cells whose formulas are affected by the selected cells. You can extend the search to all levels or restrict it to directly dependent cells.

- **Last cell**

This highlights the cell at the intersection of the lowest row and the rightmost column that contain content or formatting.

- **Visible cells only**

This excludes hidden cells from the selection. When you select a range, hidden cells are usually included. (Hidden cells in the print area are automatically excluded only during printing.)

- **Conditional formats**

This highlights cells that have conditional formatting applied.

- **Data validation**

This highlights cells with specific validation rules. To select all cells, choose the **All** option, and to select only the cells that follow the same rule as the currently selected cell, choose the **Same** option.

The locations are highlighted as a range or multiple ranges. When multiple sheets are selected, this function only works if the sheets were created in group mode. The program highlights the same cells on each sheet, based on the active sheet's context.

2.3 Efficient Data Entry and Editing

Moving the cell pointer lets you control where to enter data or formulas in the grid, and the cell grid helps you organize your data effectively. This section explains how to enter different types of data into a worksheet and how to edit cell contents when you need to. When you enter data into a cell, Excel evaluates the characters you typed, and it determines whether the input should be interpreted as a number, text string, or formula.

2.3.1 Text and Character Strings

If Excel can't interpret any given input as a number or formula, it treats the input as a text string. Text strings can include any characters and can be up to 32,767 characters long. Each character can be formatted individually, while numbers are always formatted consistently. To treat a number as text, you must explicitly tell Excel to do so, and you can do it in two ways:

1. Format the cell range by using the **Text** format. You can do this either before or after entering data.
2. Place a single quotation mark before the digits. This character won't appear in the cell.

Excel also displays error notifications related to text and character strings if error checking is enabled. If you open the menu for the error icon by clicking or tapping, you can select **Ignore Error** or, under **Error Checking Options**, deselect the **Numbers formatted as text ...** rule entirely. Thereafter, this notification won't appear again.

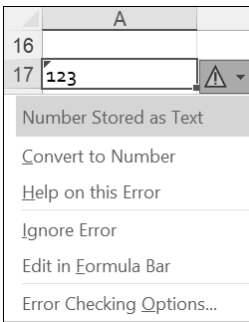


Figure 2.11 Menu for Error Notification

Wrapping Text within a Cell

Labels often require longer entries to clearly identify their content. Wrapping text within the cell helps here, and you can do this by using the **Home • Alignment • Wrap Text** button. However, Excel's text wrapping is a bit rough. While the row height adjusts automatically, words that don't fit in the column are simply cut off without hyphens or proper breaks. Widening the column can improve the result, but after you do that, the row height will no longer adjust automatically. To fix this, double-click or tap the bottom border of the row header. Then, if you shorten the text later so it fits in fewer rows, the row height will adjust automatically.

You can also control line breaks manually. To do this, press **Alt + Enter** when entering data where you want a new line to start, and Excel will automatically enable text wrapping for that cell. Another option is to suggest breaks while typing. For example, if you enter "Pre-vious year," Excel will break at the hyphen when wrapping is enabled. However, you should avoid this method if you want to name the column with the header or use the header as a field name in a PivotTable. In those cases, Excel won't ignore the break character, which means that in range names, the hyphen will be replaced by an underscore. In PivotTables, the separator is part of the field name.

Accepting Entries (AutoComplete)

Sometimes, certain entries—like product group names or suppliers in an item list—appear multiple times in a column. To help you keep track of these, Excel remembers

existing entries for each column. For example, if the product group name *Jalousie* is already present, Excel will suggest completing *J* to *Jalousie* the next time you type it. It doesn't matter if the cell you're typing in is above, below, or between previous labels in the column. Because the suggestion is highlighted, every new keystroke replaces all highlighted characters—so if you don't want to use the suggestion, you won't be slowed down. If you want to use part of the suggested characters, add the remaining characters in the formula bar. Click or tap where the entry looks different.

	B	C
3	Product name	Category
4	Louvre Ccxs	Louvre
5	Rollo BT 33	Rollo
6	Awning Blue Sk	Awning
7	Louvre VVx	Louvre
8	Rollo Dark	
9	Louvre Louise	

Figure 2.12 Example of Input Suggestion

You can also disable this functionality by going to the **Excel Options** dialog, selecting **Advanced**, and unchecking **Enable AutoComplete for cell values** under **Editing options**.

If you often use the same labels in a column, there's another way to save time typing. If you're using a mouse and keyboard, right-click a cell directly below a filled cell in a column to access existing entries via the dropdown list. If you're using a touchscreen, hold your finger on the cell, tap the arrow at the end, and choose the command.

	B	C
3	Product name	Category
4	Louvre Ccxs	Louvre
5	Rollo BT 33	Rollo
6	Awning Blue Sk	Awning
7	Louvre VVx	
8	Rollo Dark	Awning Louvre Rollo
9	Louvre Louise	

Figure 2.13 Displaying Dropdown List for Column

2.3.2 Entering Numbers

While text in a spreadsheet is mainly used for labels, numbers provide the data for calculations. Follow these rules when entering numbers:

- Format values of the same type consistently.
- Omit decimal places when they don't matter to keep the table clear.
- If values are missing initially, decide whether to leave the cell empty, enter a zero, or use the `NA()` function (the last of which shows `#NA` to indicate that the value is not yet available).

You can use digits and certain special characters: plus or minus signs, decimal points, comma separators, slashes, parentheses, percent signs, *E* or *e* for scientific notation, and currency symbols like € and \$. If you enter only digits, Excel right-aligns the input by default. If the input contains special characters along with numbers, then Excel checks whether the entire entry matches a valid number format—and if it does match, then Excel treats the input as a number.

2.3.3 Input and Output Formats

Excel initially applies the standard format to numbers. It assigns this minimal format automatically, before you apply more specific number formats. Numbers reset to this standard format when you clear the formatting in a cell range, but you can go beyond this minimal format when entering data. If the entry matches a valid number format, Excel applies that format to the cell and displays the number accordingly, and this remains until you assign a different format to the cell. For example, say you entered the following number value in cell B1:

1,000,000

The number would display the same way in the cell because a number with comma separators is a valid format. The cell adopts a fixed number format when you enter data into it, and you'll notice this if you overwrite the value in cell B1 with this number, which doesn't include comma separators:

2000000

After you enter the number, the cell will display this:

2,000,000

So, you can set the number format this way with the first entry you make in a cell. This is useful if you need to enter hundreds of numbers into a column, because it would be tiresome to type comma separators and currency symbols each time you make an entry. It's more practical to start by setting a format that automatically adds these characters so you only have to type the raw numbers. Chapter 4 explains these formatting options in detail.

Excel also offers another option for this: If you set the format in the first cell of a column, you can drag the fill handle down to the end of the column and click the **Auto Fill Options** button. Then, from the menu that you can open by clicking the small triangle, you can select **Fill Formatting Only** (see Figure 2.14). The copied numbers initially shown will disappear, but the cells will then match the format of the first cell.

To do this when using a touchscreen, tap the cell and then tap **AutoFill** in the context menu. Next, drag the arrow icon down and choose **Fill Formatting Only** from the **Auto-Fill** button menu (see Figure 2.15).

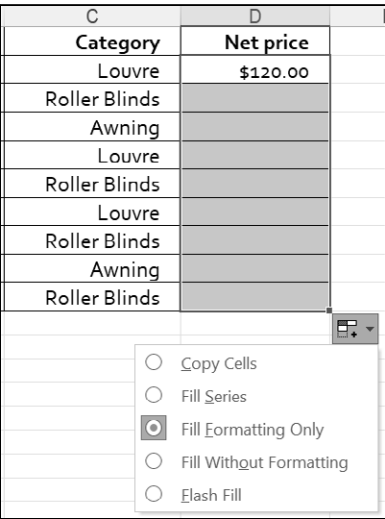


Figure 2.14 Extending Range's Formatting with Fill Handle

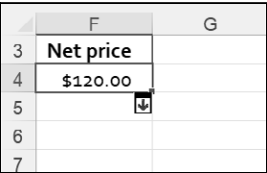


Figure 2.15 AutoFill in Touch Input Mode

Number Size and Column Width

If a number entered is wider than the column, Excel first drops decimal places from the number—unless the standard format has been replaced. If that doesn't work, it switches to scientific notation with an exponent, like 3.45E+12.

For all other number formats, Excel automatically widens the column if there isn't enough space. This only happens if the column width hasn't been manually changed. If it has, Excel shows a series of # characters instead of the number that won't fit. However, Excel still displays the value when you hover the mouse pointer over the cell. In that case, either adjust the column width or choose a more suitable format.

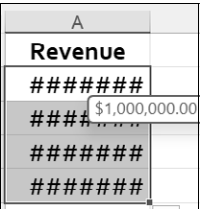


Figure 2.16 Values That Are Wider Than Column

If Excel can't find a valid number format for the characters you enter, it treats the input as text and aligns it to the left in the cell. For example, if you mistakenly enter 13/13/2018 as a date, Excel will simply treat it as text.

2.3.4 Fractions, Leading Zeros, Dates, and Times

If you're confused by how fractions or numbers with leading zeros display differently, the following sections will help. This happens because of the input formats and how Excel interprets your entries.

Entering Fractions

Excel's way of handling fraction entries is somewhat unusual. For example, if you type "1/3," the cell shows 01-Mar—but if you type "4/100," Excel treats it as text because it can't be converted into a valid date and because it isn't a formula (since it doesn't start with an equal sign). In contrast, Excel accepts your typing "2 3/4" without issue and interprets it as the value 2.75, as the formula bar shows. And if you type "0 1/3," Excel will show the desired result of 1/3. So, you can memorize all of these Excel quirks and be careful how you type fractions, or you can format the range in advance by using the single-digit fraction format.

Entering Leading Zeros

Excel also poses a small challenge when you enter numbers that begin with zeros. Normally, Excel removes leading zeros. For example, 007 becomes 7, both in the cell and the formula bar, which reduces the input to its numeric value.

However, leading zeros are often needed in numbering systems—common examples include customer numbers, article numbers, or document numbers. So, one way to keep Excel from deleting these zeroes is by entering the number as text, as explained in the previous section. However, this causes the number to lose its numeric properties, and that's a drawback for document numbers, which often need to be incremented.

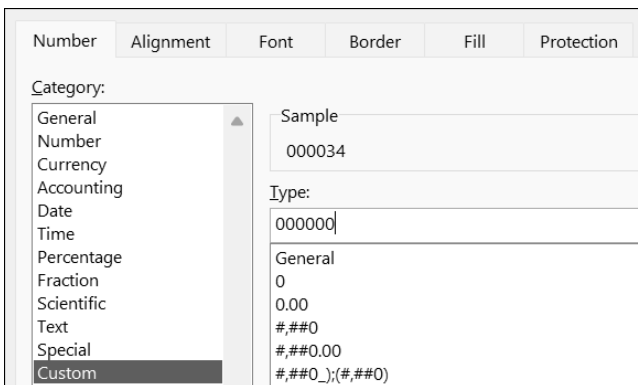


Figure 2.17 Format Pattern for Numbers with Leading Zeros

If you want to enter a number with leading zeros as a number, your best option may be to define a custom format. You can do this by opening the list under **Home • Number to Number Format** and selecting **More Number Formats**. Then, on the **Number** tab in the **Custom** category, enter a number pattern under **Type**, using as many zeros as the number's digits (see Figure 2.17).

Input with Fixed Decimal Places

If a workbook contains only numbers with the same number of decimal places, such as dollar amounts, you can use a function that removes the need to enter the decimal point. For best results, use the numeric keypad to enter numbers. Press the  key to activate the function, and in **Excel Options**, go to the **Advanced** tab and check **Automatically insert decimal point** under **Editing options**. Then, set the number of decimal places to 2, for example, and after you do that, Excel will automatically treat the last two digits of every number as decimals and insert the decimal point. You'll no longer need to enter a zero before the decimal point. However, because this setting applies to the entire workbook, you must add two extra zeros at the end of numbers in areas where you don't want decimals, such as counts.

Entering Dates and Times

Excel treats dates and times as numeric values. This makes it easy to calculate values like the date 20 days after today by simply adding 20. You can enter date and time values into a cell either by using date and time functions (formulas) or directly as constants. The allowed input formats for dates as constants vary depending on your regional settings, and some examples of valid input formats are as follows:

12-10-25
12/10/25
12.12.24
12.12.2025
December 12, 2025
12/10
12-10
Jan 12, 25
Feb 4
Jan 08
February 4

The default display format depends on your system's regional settings, which you can change in the Windows Control Panel. Excel automatically completes incomplete date entries. If the year is missing, Excel adds the current year, and if the day is missing, Excel adds the first day of the month. The full date always appears in the formula bar and forms the basis for any calculations.

You can enter time in any of the following formats:

10:30 10:30 PM
10:30 AM 10:30:30

If you omit PM/AM, Excel assumes and enters AM. Lowercase letters are automatically converted to uppercase. The formula bar always shows time in 24-hour format, so for example, 7:12 PM appears as 19:12:00. You can also insert the current date and time from your device by using **Ctrl**+**:** and **Ctrl**+**:**, respectively. You can also enter the time and date consecutively in one cell, but you must separate them with a space.



Serial Numbers for Dates and Times

Excel stores entries it recognizes as dates or times internally as serial numbers, counting the days since 1/1/1900—or alternatively, since 1/1/1904.

Time is represented by the decimal portion of the serial number, so for example, 12 PM equals 0.5. The serial number appears when you clear the cell's format.

Input Control

By default, pressing **Enter** moves the cell pointer down to the next cell. However, this doesn't apply if you finish data entry by clicking or tapping the **Enter** icon in the formula bar. You can disable or redirect the cell pointer movement through **Excel Options**, as explained in Chapter 1.

2.3.5 Changing, Searching, and Deleting Content

You can overwrite any entry unless the worksheet is protected against changes. To replace an incorrect or outdated number, select the cell, enter the new number, and confirm. For longer entries like labels or formulas, it's inefficient to retype the entire cell content after making a typo or minor change. Editing is more efficient here.

Editing Within a Cell

Excel lets you edit cell content directly in a cell or in the formula bar. To edit cell content directly, you can double-click or tap the cell, or you can press **F2**. The program will then enter edit mode, and for formulas, it will show the formula instead of the result. A blinking cursor marks the insertion point.



Figure 2.18 Cell Open for Editing

On a touchscreen, the insertion point appears as a line with a round handle at the bottom.

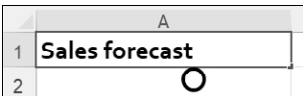


Figure 2.19 Insertion Point with Handle in Touch Input Mode

You can move the insertion point by clicking, tapping, or using the arrow keys, and you can confirm your edits by clicking another cell, tapping it, or pressing `[Enter]`.

Editing in the Formula Bar

To edit cell content in the formula bar, start by selecting the cell so its content appears there. To change a specific spot, click or tap directly on it in the formula bar. You can also highlight characters to replace by dragging with the mouse, or on a touchscreen, you can drag the round handle to select the characters.

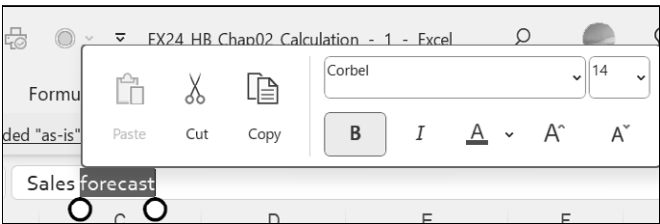


Figure 2.20 Highlighting Cell Content on Touchscreen by Dragging Handles

You can highlight entire words or arguments in a formula by double-clicking or double-tapping them, and holding down the `[Shift]` key lets you extend a selection to where you place the mouse pointer. The next character you type replaces the selected characters, and any further characters are then inserted at that position. In other words, the program normally operates in insert mode.

You can also place the insertion point on the first character to overwrite and then enable overwrite mode by pressing `[Insert]`. The insertion point is shown by a gray background on the character under the cursor. To switch back to insert mode after overwriting, press `[Insert]` again.

Key Functions for Editing Cells

In the formula bar or an open cell, certain keys and keyboard shortcuts perform specific actions.

Key Combinations	Effects
<code>[Home]</code>	This moves to the beginning of the entry.
<code>[End]</code>	This moves to the end of the entry.

Key Combinations	Effects
Ctrl + →	This moves one word or argument to the right.
Ctrl + ←	This moves one word or argument to the left.
Shift + →	This extends the selection by one character to the right.
Shift + ←	This extends the selection by one character to the left.
Ctrl + Shift + →	This extends the selection by one word or argument to the right.
Ctrl + Shift + ←	This extends the selection by one word or argument to the left.
Ctrl + Shift + Home	This extends the selection to the beginning of the entry.
Ctrl + Shift + End	This extends the selection to the end of the entry.
Ctrl + Shift + A	This inserts the arguments for a function, and you should use it after typing the opening parenthesis following the function name.
Delete	This deletes selected characters or the character to the right of the insertion point.
Backspace	This deletes selected characters or the character to the left of the insertion point.
Ctrl + Delete	This deletes from the insertion point or selection to the end of the entry.
Ctrl + A	This selects all content in the formula bar or the cell being edited.
Ctrl + C	This copies the selected characters to the clipboard.
Ctrl + X	This cuts the selected characters and moves them to the clipboard.
Ctrl + V	This pastes data from the clipboard at the insertion point or replaces the selected characters.
Ctrl + Shift + V	This pastes only the value from the clipboard, ignoring its format.

Cut or copied text can replace a selected string or be pasted into another cell or the formula bar of a different cell. When working with longer texts or complex formulas, use the editing commands Excel provides. The **Cut**, **Copy**, **Paste**, and **Delete** commands are also available in the formula bar and during direct cell editing.

Finding and Replacing

Sometimes, you need to change names, labels, or numeric values after you enter them, and you can use the **Find and Replace** dialog box to do this. You can find it on the **Home** tab, in the **Editing** group, under **Find & Select** and the **Find** options as well

as the **Replace** options. The dialog box has separate tabs for find and replace, with mostly identical options.

Keep three points in mind when using this functionality:

1. Excel compares the search criterion with the content of the cell ranges included in the search, and it finds a match if the search string appears anywhere in the cell content. For example, a search for the *Hat* criterion will also find cells containing *Summer hat* or *Hat box*. This also applies to numbers: the *5* criterion matches *5*, *15*, *57*, and so on. To match the entire cell content exactly, enable the **Match entire cell contents** option ❶.
2. When you're searching for numbers, dates, or times, Excel compares the search term by default to the cell's stored content as shown in the formula bar, not the displayed content in the cell. To find a date displayed as *12-Dec*, you can enter a search term like "12/12/2024." Excel will also find the date if you enter just "2024" because it matches part of the cell's content.
3. If you need to, you can expand the search for numbers and text to the entire workbook by clicking **Options** ❷ and choosing the options under **Within**: ❸, so the search isn't limited to the sheet. The list under **Search**: ❹ lets you choose whether to search by rows or columns, and you can also limit the search to formulas, values, notes, or comments by using **Look in**: ❺.

You can click **Find All** ❻ on the **Search** tab to list all matches in the table or workbook, and you can jump to each location you find by clicking or tapping the table rows or using the arrow keys.

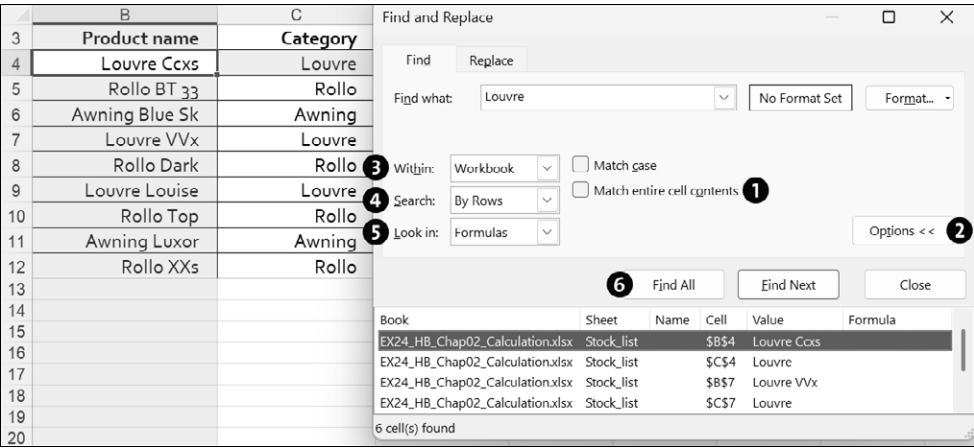


Figure 2.21 Search Results on Find and Replace Screen

You can press **Ctrl+F** to open the **Search** dialog box quickly, and you can use the **Alt+F4** and **Ctrl+Alt+F4** shortcuts to search forward or backward with the

same term without opening the dialog box again. Press **Ctrl**+**H** to open the dialog box directly on the **Replace** tab.

In Excel, you can search for and replace not only numbers and text but also formats—for example, to update cells showing two-digit years to display full years. After you press the **Options** button, additional buttons appear, one being **Format...**, whose arrow you can click to open a small menu. Clicking the first option opens the **Find Format** dialog box, which corresponds to cell formats.

Clicking the second option, **Choose Format From Cell**, is especially useful when you're searching for cells that match a format that's already used in the workbook. You can select the sample cell with the specified format by clicking or tapping it, and to stop searching for formats and search only by content again, you can use the **Clear Find Format** option.

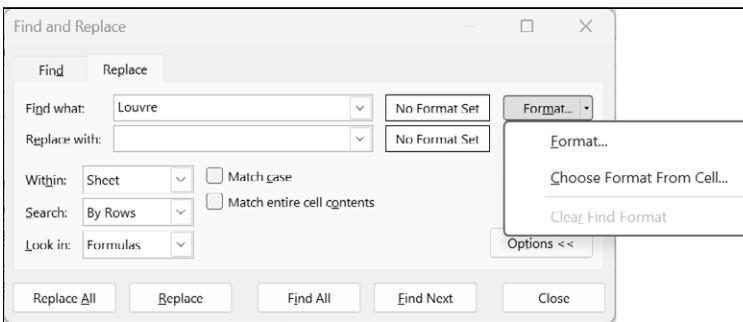


Figure 2.22 Find and Replace Options

Use the **Find & Select** button menu in the toolbar to highlight cells with formulas, constants, conditional formats, or notes.

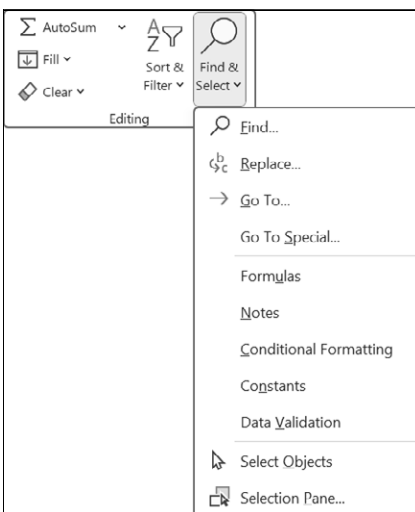


Figure 2.23 Find & Select Button Menu

2.3.6 Clearing Methods

The term *clearing* can refer to different actions related to a cell or cell range's properties:

- Clearing cell content
- Clearing cell format
- Clearing notes or comments
- Clearing links
- Clearing sparklines

You need to distinguish this from removing cells, which is called *deleting*. This will be explained further later in this section.

When you clear a cell's content, the cell becomes empty. This may seem obvious, but it's important to stress because a cell can look empty without actually being empty. This happens when a cell contains spaces, and if you double-click such a cell, the cursor won't be at the far left but just after the last space. These hidden spaces can cause confusion, especially when querying tables.

Clearing the cell format doesn't mean the cell loses all formatting. It simply resets to the default format. For example, if you've chosen a specific font, the cell will revert to the default font. The same applies to number formatting.

Pressing the `Delete` key only removes the cell's content; the formatting stays intact, and notes, comments, and sparklines remain unchanged. To clear cell contents with a mouse, select the cell or range, drag the fill handle inward until the entire area is covered by the grid, and release the mouse button to clear the selected range.

In **Touch input** mode, you can do the same thing by opening the context menu for the range, showing the arrow icon for the **AutoFill** command, and dragging it into the range. You can also quickly clear by tapping the cell or range and selecting **Clear Selection** from the context menu.

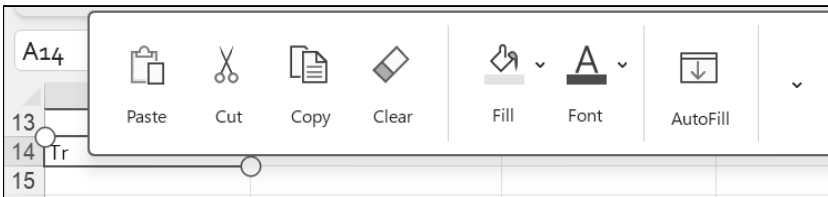


Figure 2.24 Clearing Cell Contents on Touchscreen

To clear entire columns or rows, select them by clicking or tapping the column or row headers, and to clear multiple columns or rows, drag across the relevant headers then drag the fill handle inward. Then, when you release, the contents of the selected columns or rows will be cleared. If you realize you selected the wrong range while dragging, simply drag the mouse pointer back to the fill handle and release the button.

To clear formatting and any comments along with the contents, hold **Ctrl** while dragging the fill handle—after which, a plus sign will appear next to the crosshairs. To do this on a touchscreen, tap the header of the first column or row, then expand the selection by dragging the round handles. After that, hold your finger briefly on the selected area and choose **Clear Selection** from the context menu.

2.3.7 Clearing Large Areas

Using the fill handle is a handy way to clear single cells or small ranges. For large areas, it's easier to select the range first and then use **Delete** or **Home • Editing • Clear**.

The button opens a menu where you can choose what to clear: all, only formats, only cell contents, only hyperlinks, or only comments and notes. If you select a link, it will also enable the **Remove Hyperlinks** option, which removes the cell's formatting as well.

You can also use the **Clear Contents** command from a range's context menu, and you can undo any clear action with the **Undo** button if you accidentally select the wrong range. Cells containing sparklines (see Chapter 9) have a special status. They aren't part of the cell content or format, so to clear them, choose **Clear All** from the **Clear** button menu.

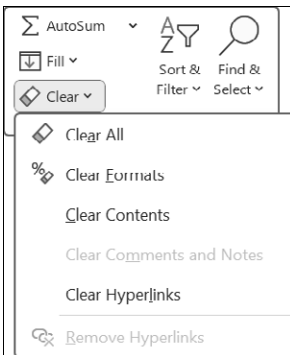


Figure 2.25 Menu of the Clear Button

2.3.8 Spell-Check and AutoCorrect

No matter how elegantly formatted a table or chart is, spelling errors in the text are always frustrating. Spelling mistakes can cause information to be incorrect, such as when a product name is wrong in an order.

Checking with Dictionaries

Excel provides dictionaries for multiple languages, allowing you to easily check workbooks with English, French, or Spanish labels. To use a dictionary in another language when checking a workbook or selected range, select the desired language from the **Dictionary language** list in the **Spelling** dialog box.

Because dictionaries can't cover every word combination or specialized term in your workspace—like technical terms, product names, abbreviations, company names, and customer names—it's a good idea to create your own custom dictionaries (known as *user dictionaries*) that you can use to check the spelling of such terms. Protected documents, formulas, and text generated by formulas will be excluded from such spell-checks.

To check text in the formula bar or the cell you're editing, you have two options:

1. To check a specific word or part of a cell's content, just select it.
2. To check all of a cell's contents, simply start the spell check. The quickest way is to press **[F7]** or click the **Spelling** button in the **Review • Spelling** group. Excel will check the worksheet starting from the active cell, and if you previously selected a range, it will only check that range. If Excel finds no errors, it will simply confirm that the check is complete.

If the pesky typo pixie strikes, call on Excel's **Spelling** dialog. Whenever possible, Excel will offer correction suggestions under **Suggestions** that you can accept by clicking **Change** **1**. If no useful suggestions appear, you can type the correct value in the first text field and accept it by clicking **Change**. Selecting **Change All** **2** ensures that the error will be automatically corrected whenever it appears again.

While the dialog remains open, you can undo any correction by clicking the **Undo Last** **3** button. If you click the **Undo** button on the Quick Access Toolbar after closing the dialog, all corrections made within the dialog will be undone.

If the word is spelled correctly but isn't in the dictionary or user dictionary, you can click **Ignore Once** **4** and Excel will leave the word unchanged and move on to the next error. Clicking **Ignore All** **5** will leave all other instances of this word unchanged as well, and the program will maintain a list for this. Alternatively, you can add the flagged word to a user dictionary by clicking **Add to Dictionary** **6**.

If you don't want to use the default standard *RoamingCustom.dic* user dictionary, click the **Options** button **7**.

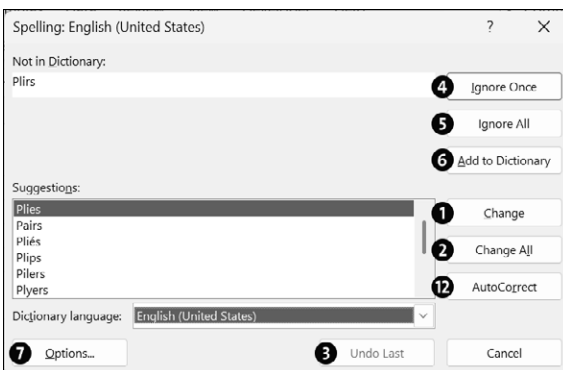


Figure 2.26 Correction Suggestions in Spelling Dialog

This opens the **Excel Options** dialog, and on the **Proofing** page, you'll find a **Custom Dictionaries** button **8** next to several spell-check settings. Select the dictionary you want from the list, or if it's not listed, click **Add** **9** and enter the dictionary's path. To create a new dictionary, click the **New** button **10** and provide a name.

To edit a custom dictionary's word list here, select the dictionary and then click **Edit Word List** **11**.

The **AutoCorrect** button **12** in the **Spelling** dialog (see Figure 2.26) also lets you add both incorrectly and correctly spelled words to the list used by the related **AutoCorrect** feature. Whenever you mistype a word, it will automatically be replaced with the correctly spelled one, as described in the next section.



Figure 2.27 Document Proofing Settings

2.3.9 Automatically Replacing Entries

The spellchecker is enhanced by the **AutoCorrect** feature, which catches errors as you type and corrects them automatically. For example, if you accidentally type *comapny* instead of *company*, AutoCorrect will correct it to *company* when you leave the cell. AutoCorrect can also create shortcuts for frequently used long entries, so if, for example, if you often need to enter the term *Finance Office* into your tables, you can use the shortcut *FO*. You can also define what gets replaced with what in the **AutoCorrect** dialog box, and you do this by accessing it via **File • Options • Proofing** and clicking the **AutoCorrect Options** button.

The **AutoCorrect** dialog box includes a list of common mistakes and shortcuts, and by default, it corrects some standard errors, like two capital letters at the start of a word. However, since such letter combinations can occur in abbreviations, you can add exceptions to autocorrection by using the **Exceptions** button. **AutoCorrect** is also handy for entering special characters. For example, if you frequently need to enter the Japanese yen symbol, you can set *yy* under **Replace** and the key combination **Alt** + **0165** under **With** in the **AutoCorrect** dialog box.

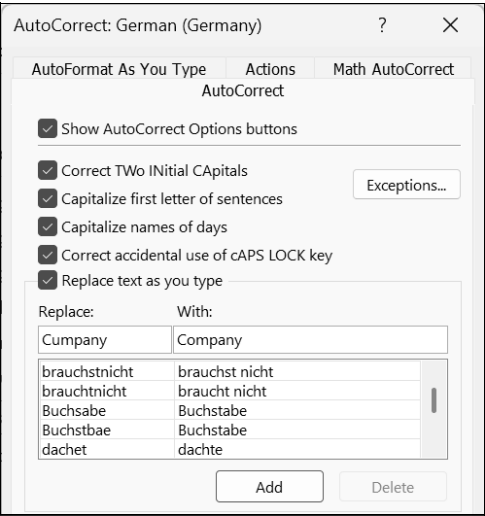


Figure 2.28 The AutoCorrect Dialog Box

Mathematical AutoCorrect

Since Excel 2010, this dialog has included the **Math AutoCorrect** tab. It also contains several pairs of replacement strings for inserting mathematical symbols, like `\phi` for the symbol ϕ . However, these symbols are only available when you're entering formulas with the formula editor, which you can find under **Insert** in the **Symbols** group.

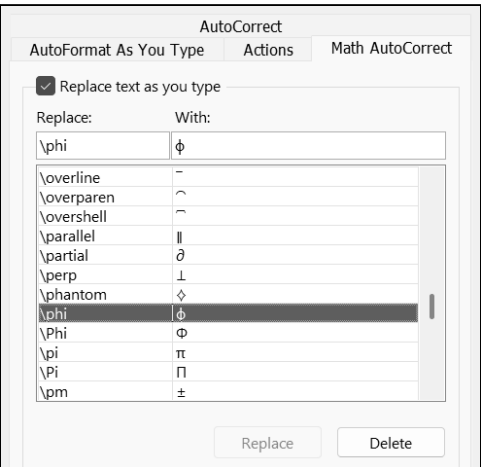


Figure 2.29 Placeholder Strings for Mathematical Symbols

2.4 Automatically Generating Data

Whenever you need to fill a cell range with data that forms a clear sequence, you can automate the entry. Creating a series makes it easier to label rows and columns and to

number items or storage locations continuously. If you need test data for simulations or to test formulas or macros, the fill feature can save you a lot of time.

You can use two methods to work with the fill handle: the **AutoFill** icon on the touch-screen or the **Home • Editing • Fill** button, the latter of which opens a menu with several options for creating a series. The first method lets you create small series quickly, while the second method gives you more control over the elements you create large series.

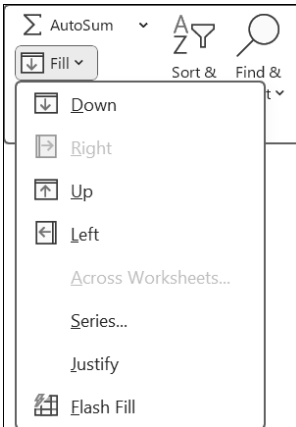


Figure 2.30 Fill Button Menu

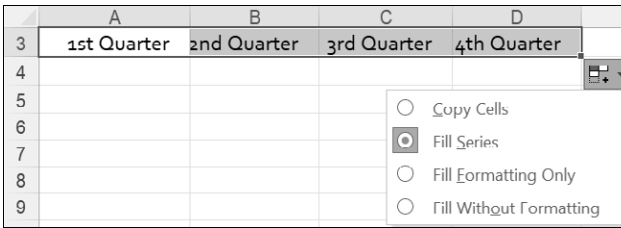
2.4.1 Dragging Data Series with a Mouse

Quarter labels are common data series, and dragging works well with them. You can do this as follows:

1. Enter the label for the quarter where the series should start—it doesn't have to be the first quarter.
2. Place the mouse pointer exactly on the fill handle.
3. Hold down the left mouse button and drag the helper frame that appears, either right or left within the row or up or down within the column. The current quarter is always displayed for confirmation.

	A	B	C	D
1	Visit evaluation			
2				
3	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
4				4th Quarter

4. If a series is too long, drag the fill handle in the opposite direction until the extra cells are removed.
5. Release the mouse button and Excel will fill the range selected by the helper frame.

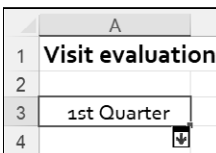


By default, Excel copies the source cell's formatting to the new cells when filling. However, Excel usually shows the **Auto Fill Options** button, which you can click to open a menu where you can specify that Excel shouldn't copy the source cell's formatting in specific cases.

2.4.2 Working with Series on a Touchscreen

Selected cells on a touchscreen don't show a fill handle unless you use a Surface Pen and have enabled **Use pen by default to select and interact with content** under **File • Options • Advanced • Pen**. As mentioned earlier, you can display a larger box that lets you create series by using your finger. Here's how you do that:

1. If you briefly tap the cell for the first quarter, the **AutoFill** button appears in the context menu.
2. This button displays a larger icon with an arrow instead of the fill handle.
3. Dragging this icon to the right with your finger inserts a series with the other quarters.



You can also drag the **AutoFill** icon down to create series that run down columns. Dragging the icon up or to the left shortens an existing series or creates a new descending series.

2.4.3 Series or Copies?

What happens when you drag to fill depends on the content of the starting cell(s) you initially select. Excel checks whether it can create a continuous series from those contents or not, and if it can't, it simply copies the cell contents. To prevent Excel from creating a series when you only want copies, hold down **Ctrl** while dragging, which

forces Excel to copy the cells instead. Alternatively, use the **Copy Cells** option from the **Auto Fill Options** button, which lets you convert a series into copies afterward or vice versa. The button will disappear only after you enter new data or save the file.

If the original cell contains a name like *Miller*, then dragging the fill handle or the **Auto-Fill** icon fills the cells with *Miller*. If you enter *House 1* in the first cell, then the program assumes you want to number a series, such as *House 1*, *House 2*, *House 3*. Note that it doesn't matter whether the number is at the start or end of the cell entry, but if it's at the start, then it must be separated from the text by a space. However, in some places (like Germany), a period can follow a number, so an entry like *1.Day* (with no space after the period) will always remain *1.Day* while an entry like *1. Day* (with a space after the period) will create a series. The initial text *1 MB* creates a numbered sequence, no matter the locale. You can also use *1st* to generate an ordinal number sequence like *1st*, *2nd*, *3rd*, *4th*, and so on.

To create a continuous numbering, simply enter "1" or another starting number in the first cell and then select the **Fill Series** option under **Auto Fill Options**. Otherwise, Excel will just copy the number. Alternatively, you can hold down the **Ctrl** key while dragging with the mouse. If the sequence shouldn't increase by one, then you should first fill and select two cells. Put the starting value in the first cell and the next value in the second cell so Excel can detect the step size (**Increment**).

2.4.4 Ascending and Descending Sequences

To create ascending sequences, drag the fill handle or the **AutoFill** icon into the right or lower neighboring cells, and to create descending sequences, drag it into the left or upper neighboring cells. Be sure to drag beyond the initially selected range; otherwise, it will be overwritten!

2.4.5 Time Series

Some temporal series, like dates, can be linear. Others, like times, weekdays, or months, can be circular. Intervals between items in a series are either set automatically in steps of one based on the first value or defined by the content of a second cell. Here are some examples:

Starting Values	Series Continuation
8:15	9:15 10:15 11:15
Tue	Wed Thu Fri Sat Sun Mon Tue
Monday	Tuesday Wednesday Thursday

Starting Values	Series Continuation
May-01 May-15	May-29 Jun-12 Jun-26
January	February March April
May-13 Sep-13	Jan-14 May-14 Sep-14
1st quarter	2nd quarter 3rd quarter

Quarter can be written out or abbreviated as *Q1*, *Q2*, ... and month and day names can be written out or abbreviated.

2.4.6 Arithmetic Series

Arithmetic series have a constant interval, so to create such a series with a mouse, you just select two cells containing the first and second values.

Starting Values	Series Continuation
4 7	10 13 16 19
6 3	0 -3 -6
1.2 1.6	2 2.4 2.8
1st	2nd 3rd 4th
1st 5th	9th 13th 17th

2.4.7 Geometric Series

In a geometric series, each value is multiplied by a constant factor from the previous one. These series can only be created by using the **Series** dialog box, which is accessed via **Home • Editing • Fill • Series**, using the **Type: Growth** option. The options here correspond to those that are available with the fill handle or the **AutoFill** icon.

Starting Values	Series Continuation
2 (Step value 2)	4 8 16
3 (Step value 5)	15 75 375

2.4.8 Creating a Trend Analysis

By using the fill handle or the **AutoFill** icon, you can easily perform a simple trend analysis. For example, you can enter visitor numbers for the last six months in a column,

select those six cells, and then drag the fill handle or **AutoFill** icon down to fill six more cells. You'll then receive an arithmetic trend calculation for the second half of the year using the least squares method, and the original values will remain unchanged. Figure 2.31 shows an example with an area chart that analyzes the number series.

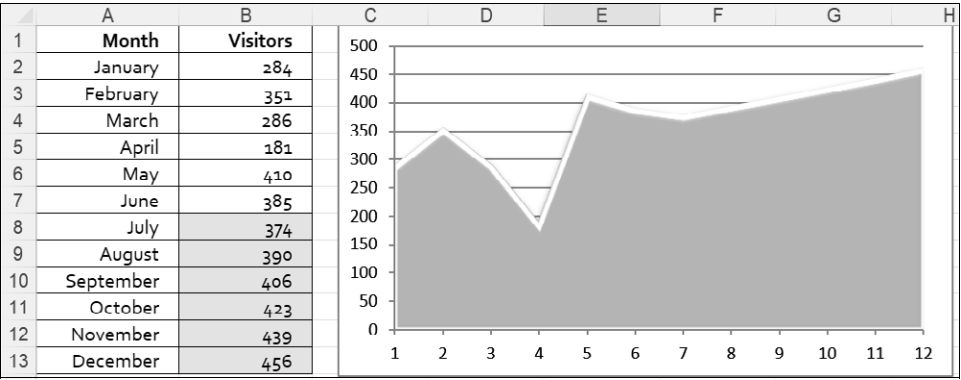


Figure 2.31 Linear Trend Analysis of Visitor Numbers

2.4.9 Special Options for Date Values

If you need a list of weekdays, select the **Fill Weekdays** option from the **Auto Fill Options** menu, which automatically fills only the working days.

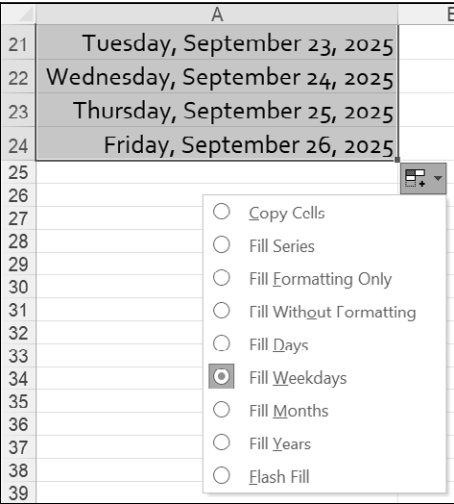


Figure 2.32 Special Series Options for Date Values

Dragging the fill handle with the right mouse button opens additional options in the **Auto Fill Options** menu. For number values, you can calculate both arithmetic and exponential growth trends here while keeping the original values unchanged.

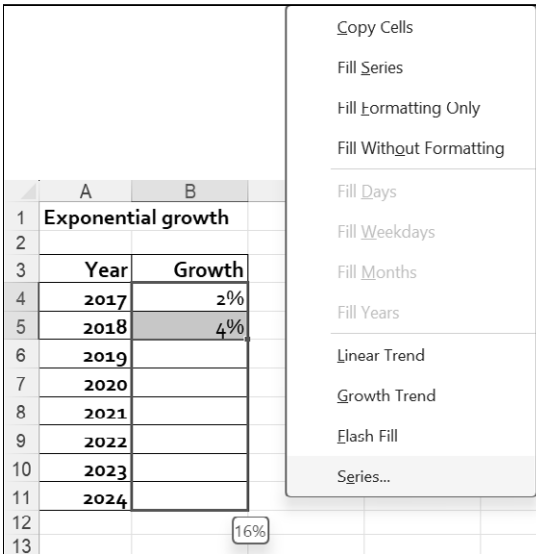


Figure 2.33 Calculating Exponential Trend Using Fill Handle

2.4.10 Creating a Series in the Dialog Box

The dialog at **Home • Editing • Fill • Series** offers additional options for creating a series, but the process works a bit differently. You have two options:

1. Before running the command, select the entire range to fill, including the starting cell. You can also use multiple cells as starting points, as in Figure 2.34.
2. Alternatively, select only the starting cell(s) and control the series length by setting the end value in the dialog box.

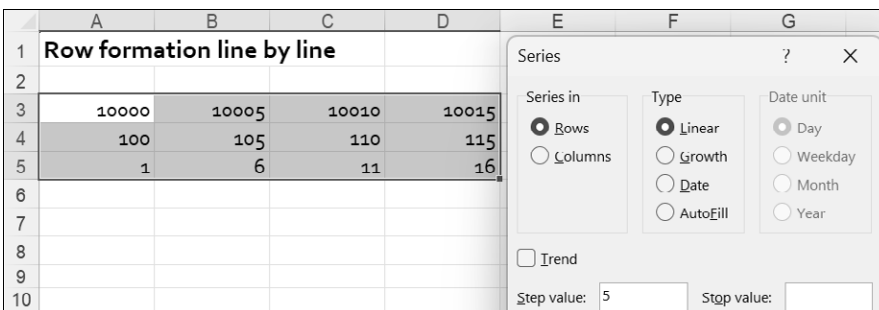


Figure 2.34 Selecting Entire Series Range in Advance

If you have only selected the starting cell(s), choose under **Series in** whether the series should fill across the row (to the right) or down the column. In the second options group, select the **Type** of the data series from the list. Here are the effects of selecting each type:

■ Linear

This setting adds the step value entered under **Increment** to the last value each time. If the **Trend** checkbox is checked, Excel ignores the entry in **Step value** and calculates a linear trend. Unlike the corresponding mouse function, this overwrites the starting values.

■ Growth

This setting multiplies the last value by the step value each time. If the **Trend** checkbox is checked, Excel ignores the step value and calculates a geometric trend. The initial values will be overwritten.

■ Date

If you select this setting, you can choose the unit for the series under **Date unit** and the step value will then apply to this unit.

■ AutoFill

This setting ignores **Step value** and **Stop value**. It requires you to select the entire range for the series first, and the series type must be clear from the values in the initial cells. It works the same way as dragging the fill handle.

Excel sets the type based on the **Home** cell you select.

Except for the **AutoFill** option and the **Trend** setting, you can enter the increment for a data series under **Step value**. You only need to enter the **Stop value** if you don't select the entire range for the series. The stop value lets you specify exactly where the series should stop, and you should enter the value in a format that matches the series type—so for time values, use a valid date or time format.

In the **Fill** button menu, you'll also find an **Align** option that applies only to cell ranges containing text strings. This function consolidates text strings spread across multiple cells in a column or row into as few cells as possible, with the column width determining how many rows are affected.

2.4.11 Custom Series

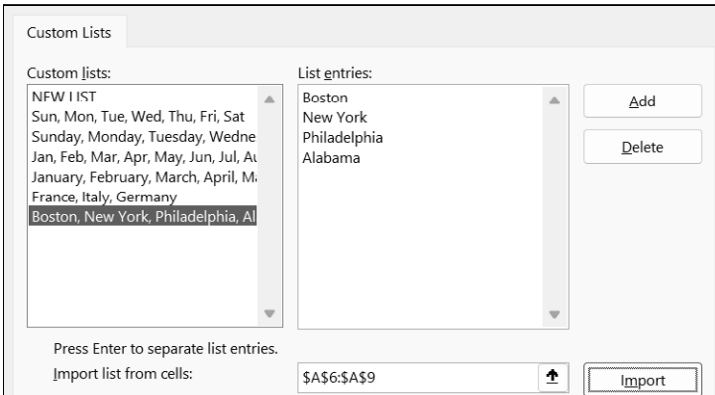
Besides the data series described earlier, you can create series that are completely independent of numerical or time sequences. For example, you can create a list of company branches or departments or a breakdown of product groups.

Defining a List of Branches

To define branch locations as a data series, follow these steps:

1. In the **Excel Options** dialog, go to the **Advanced** page, and under **General**, click the **Edit Custom Lists** button to edit.
2. You can enter the list directly here or import it from a column or row in a worksheet. To do this, select **NEW LIST** in the left pane.

3. If you want to enter the list manually, type each value under **List entries** on a separate line and press **Enter** after each entry. When you're finished, click **Add**.
4. For long lists or when you can use values from existing tables, importing the list entries is more convenient. To do this, select the appropriate range under **Import list from cells** and click **Import**.



To use a custom list in the worksheet, enter a valid list entry into the first cell of the range you want to fill and then drag the fill handle or the **AutoFill** icon right or down to fill in the remaining entries. The lists cycle continuously. Alternatively, instead of dragging the fill handle, you can select the area to fill in first, go to **Home • Editing • Fill • Series**, and choose the **AutoFill** option.

2.4.12 Input Using Pattern Recognition

A newer way to fill columns is called **Flash Fill**, though the name can be a bit misleading because it uses pattern recognition to work. This method can help when you're working with addresses, so here's an example to illustrate:

1. Start by importing a column of last and first names separated by commas from an external data source.
2. Next, you want to store the last name separately in the adjacent column as a username. To do this, enter the first username in the first cell of the second column.
3. Then, in the second cell below, use the **Home • Editing • Fill • Flash Fill** command—or to do it faster, press **Ctrl+E**—and the program will automatically fill in the last name for the entire column.
4. Finally, a **Flash Fill Options** button appears in the first cell, offering commands you can use to undo the fill or select the filled cells if you need to.

This method works with many other patterns as well. For example, if you have a column of ISBN numbers and want to extract the second number, you can do it if the number groups are separated by dashes.

	A	B
1	Adresses	
2		
3	Karman, Karl	Karman
4	Schatte, Lena	Schatte
5	Vondenberg, Hans	Vondenberg
6		
7		
8		
9		
10		
11		

- ↶ Undo Flash Fill
- ✓ Accept suggestions
- Select all 0 blank cells
- Select all 2 changed cells

It also works the other way around. For instance, you can combine the contents of two columns into a new one, such as by merging separate first and last names into a customer name. You can also replace certain identifiable parts with others, and you can add character strings or digits at specific positions. If the first pattern isn't unique, use two or three patterns so the program can work as accurately as possible.

A series you create can also be automatically updated later. If you shorten the first name in the first cell of the row in the example with first and last names, then the other first names in the column will also be shortened. Figure 2.35 shows several examples of this.

	A	B	C
1	Helmut Vonhoegen (Hrsg.)	H. Vonhoegen (ed.)	
2	Helmut Kraus (Hrsg.)	H. Kraus (ed.)	
3	Andreas Maslo (Hrsg.)	A. Maslo (ed.)	
4			
5	049-221-888888	+49(221) 888888	
6	049-211-77777	+49(211) 77777	
7	001-7777-999999	+01(7777) 999999	
8			
9	(6/7) + (7/5)	(6 / 7) & (7 // 5)	
10	(3/6) + (5/3)	(3 / 6) & (6 // 3)	
11	(2/5) + (6/3)	(2 / 5) & (5 // 3)	
12			
13	3-540-653566-2	35406535662	
14	34-77-666-555	3477666555	
15	345-777-66-7777	345777667777	
16			
17	House 1	Boston	House in Boston
18	House 2	New York	House in New York
19	House 3	Buffalo	House in Buffalo

Figure 2.35 Examples of Flash Fill Function

Flash Fill often eliminates the need for complex text transformations using macros and text functions, and the command is also available on the **Data** tab in the **Data Tools** group.

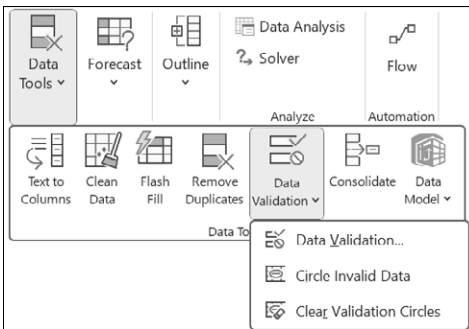
2.5 Data Entry Validation

When you enter data into a cell, there won't be any checks on data type, value, or length unless macros control the input. Excel lets you set data rules for specific cell ranges without any programming.

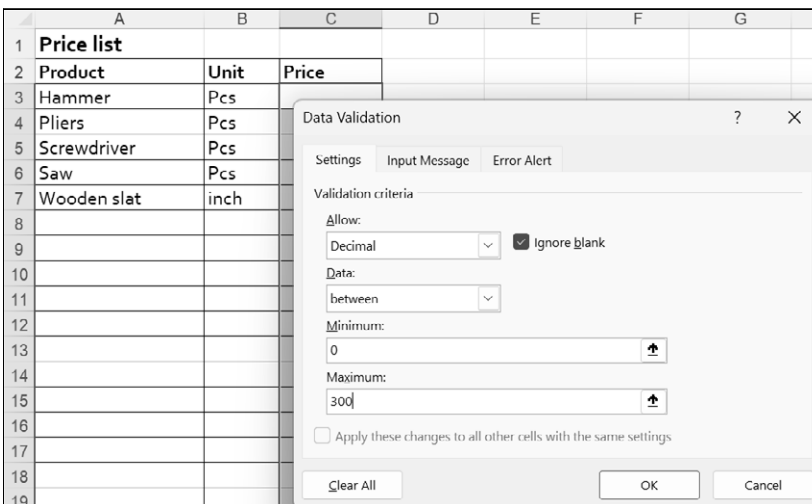
2.5.1 Validation Rules for a Price Column

To prevent accidental entry of a negative price or a price that's higher than that of the most expensive item on a price list, you can do the following:

1. Select the cell range where you want to apply validation rules.
2. On the **Data** tab in the **Data Tools** group, click the **Data Validation** button.



3. On the **Settings** tab, under **Allow**, choose **Decimal**, and under **Data**, select **between**.
4. Under **Minimum**, enter "0," and under **Maximum**, enter, for example, "300."
5. Check the **Ignore blank** box to prevent the system from issuing error messages when the price hasn't been entered yet.



6. On the **Input Message** tab, enter a note that appears when a cell is selected. Make sure the **Show input message when cell is selected** box is checked.
7. Enter a title, like “Price,” along with the input message text.

Settings Input Message Error Alert

☒ Show input message when cell is selected

When cell is selected, show this input message:

Title:
Price

Input message:
Enter the gross price here

8. Finally, on the **Error Alert** tab, enter a message that guides users when they make invalid entries.
9. From the **Style** dropdown list, select the symbol that starts the error message. This choice isn't just visual; it also controls how Excel responds to errors. If you select the **Stop** option, Excel blocks incorrect entries from being entered into the cell and you must either re-enter the data or cancel. With the **Warning** or **Information** options, Excel can either allow or reject incorrect entries.

Settings Input Message Error Alert

☒ Show error alert after invalid data is entered

When user enters invalid data, show this error alert:

Style: Stop

Title: invalid value

Error message: must be between 0 and 300

When you select such a cell, the preset input prompt appears first. For example, if you enter a price that's too high, the defined error message will appear.

	A	B	C	D	E	F	G
1	Price list						
2	Product	Unit	Price				
3	Hammer	Pcs	400				
4	Pliers	Pcs					
5	Screwdriver	Pcs					
6	Saw	Pcs					
7	Wooden slat	inch					

Price Input
Enter the gross
price

Invalid value

Price > 0 and < 300

Retry Cancel Help

Figure 2.36 Error Message for Price That's Too High

2.5.2 Highlighting Incorrect Data

If you allow invalid data by using the **Warning** or **Information** options, then the menu under the **Data • Data Tools • Data Validation** button will offer the **Circle Invalid Data** option, which highlights the corresponding cells in red. The next option, **Clear Validation Circles**, removes these error markings.

You can also apply validation rules to cells that are used for calculations rather than input. If a calculated value exceeds a set maximum, the cell will be circled in red during validation.

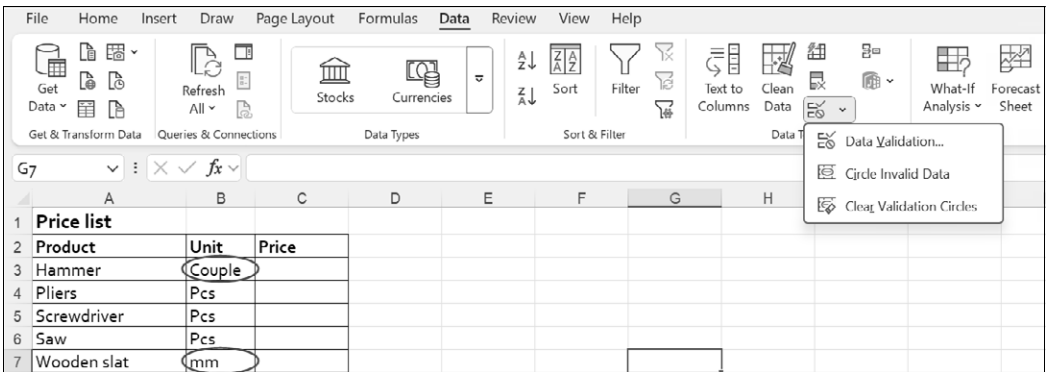


Figure 2.37 Highlighted Invalid Data

2.5.3 Input Lists

Data validation can also use lists that let users select entries without typing. In the displayed price list, only *inch*, *m*, *cm*, and *Pcs* are usually allowed as packaging units, and you can set this by choosing **List** under **Allow** on the **Settings** tab. You can enter the list itself under **Source**, using commas to separate items: *inch, m, cm, pcs*. This is sufficient here. Instead of listing possible values, you can also reference a cell range containing the list. In this case, it's best to use a named range so you don't have to update the reference when the list expands.

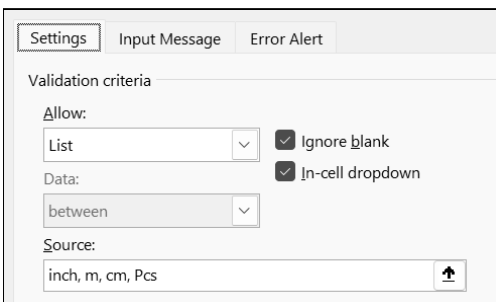


Figure 2.38 Entry of List of Allowed Values

When you select a cell with this validation rule, a small button appears that opens the list of allowed entries, and you can just click or tap the desired entry to select it. This requires that the **In-cell dropdown** option stays checked on the **Settings** tab.

	A	B	C
1	Price list		
2	Product	Unit	Price
3	Hammer	Pcs	
4	Pliers	Pcs	
5	Screwdriver	inch	
6	Saw	m	
7	Wooden slat	cm	
8		Pcs	

Figure 2.39 Selected Cell with Open List

Selecting from a list of entries has been improved, especially for large lists. Once you type the first character or characters in a cell, the list filters to entries matching those characters.

	A	B	C	D	E	F
1	Price list					
2	Product	Unit	Price			Available Products
3	Hammer	Pcs				Hammer
4	Pliers	Pcs				Pliers
5	Screwdriver	Pcs				Screwdriver
6	Saw	Pcs				Saw
7	Wooden slat	inch				Wooden slat
8						Drill
9	Hammer					Nails
10	Pliers					Metal file
11	Screwdriver					
12	Saw					
13	Wooden slat					
14	Drill					
15	Nails					
16	Metal file					

Figure 2.40 Selection from Larger List

2.5.4 Validation with Formulas

In addition to limiting entries to specific values, dates, or times, you can use formulas to validate input. For example, to control values based on a variable threshold in another column, you can name the cell with that threshold and choose **Custom** under **Allow** on the **Settings** tab. Under **Formula**, you can enter, for example, “=SUM(B\$3:B\$7) <= Maximum” if the column starts at B3. If the limit is exceeded, you can enter a message like “Value too high” under **Error Alert** to prompt a new entry.

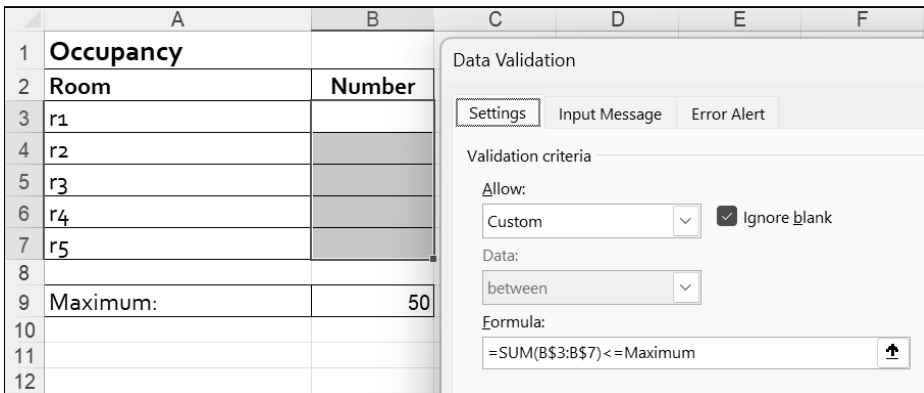


Figure 2.41 Data Validation with Formula

2.5.5 Editing or Deleting Rules

To change a validation rule, you don't need to select all cells that use it. Do this instead:

1. Select one affected cell.
2. Go to **Data • Data Tools • Data Validation** and update the entries in the dialog box.
3. Check the box labeled **Apply these changes to all cells with the same settings**.

Excel will apply the new rule to all cells that previously had the old rule. To delete all rules, click the **Clear All** button in the dialog box.

2.5.6 Applying Rules

To extend a validation rule to additional ranges, select the cells where the rule currently applies along with the new cells you want to include. Then, when you use **Data Validation** again, you'll be prompted to extend the validation to the new cells. Finally, select **Yes** and confirm the data in the dialog box.

Existing rules are also preserved when you move or copy cells, and you can extend a validation rule to adjacent cells by using the fill handle or the **AutoFill** icon.

2.6 Reorganizing and Restructuring Sheets

Unlike characters written on paper, characters in a worksheet don't stick to a cell. You don't need scissors or glue to rearrange the structure of a table.

2.6.1 Rearranging and Copying Cell Ranges

To help you rearrange labels, values, or formulas, Excel offers the **Move** operation, which clears data from the old location and places it in the new one. You'll also need to

use the **Copy** operation when working in a worksheet, whenever you need data in multiple places and especially to create structurally similar formulas from one formula. Copying is often worthwhile, even if the copy needs some editing afterward.

When you're moving or copying data, not only the cell content but also the format and any existing notes or comments are usually transferred. When you're copying data, you can also handle content, format, and notes or comments separately.

Moving Cell Entries with a Mouse

The easiest way to move the content and format of a cell or selected range to another location is via drag and drop:

1. Place the cell pointer on the selection frame until it changes into an arrow with cross-hairs.
2. Hold down the left mouse button and drag the frame to the target position. The current cell address always appears for confirmation.
3. Release the mouse button at the target position.

	A	B	C	D
1	Sales forecast			
2				
3	2025	Boston	New York	Philadelphia
4				
5	Product group 1			
6	Product group 2			

If you drag beyond the window edge, the window scrolls in that direction. You can also move entire rows or columns with this method by simply selecting the row or column headers and dragging the frame. This lets you reorder columns in a table within seconds. If data already exists at the target position, Excel will ask if you want to overwrite those cells.

Moving and Inserting

If you want to move cell contents to a spot where you must first create space by inserting new cells, then you can do it with a mouse in a single step.

Suppose you have a table where the first quarter values for two years are initially arranged side by side. To compare them more easily, you can rearrange the columns so the values for the comparison month are next to each other. Here's how you do it:

1. Select the month column you want to move.
2. Place the cell pointer on the selection border, hold down the **Shift** key, and drag the mouse pointer to the target position.
3. An I-beam will appear on the mouse pointer, and you should position it exactly on the column line where you want to insert the cells.

	A	B	C	D	E	F
1	Sales					
2						
3		Jan-23	Feb-23	Mar-23	1st Quarter 2023	Jan-24
4	Product 1	10000	12000	12000	34000	11000
5	Product 2	12000	14400	17280	43680	13200
6	Product 3	13000	15600	18720	47320	14300
7	Product 4	11000	13200	15840	40040	12100
8	Product 5	10000	12000	14400	36400	11000
9	Product 6	12000	14400	17280	43680	13200

When you release the mouse button, the data moves from its original spot to the insertion area and the existing data shifts right.

Moving to Other Sheets or Workbooks

To move a range to another sheet, follow these steps:

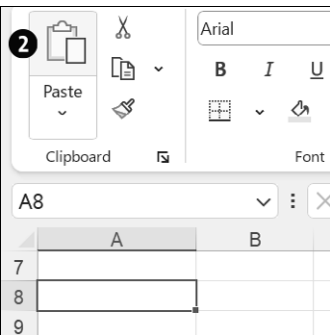
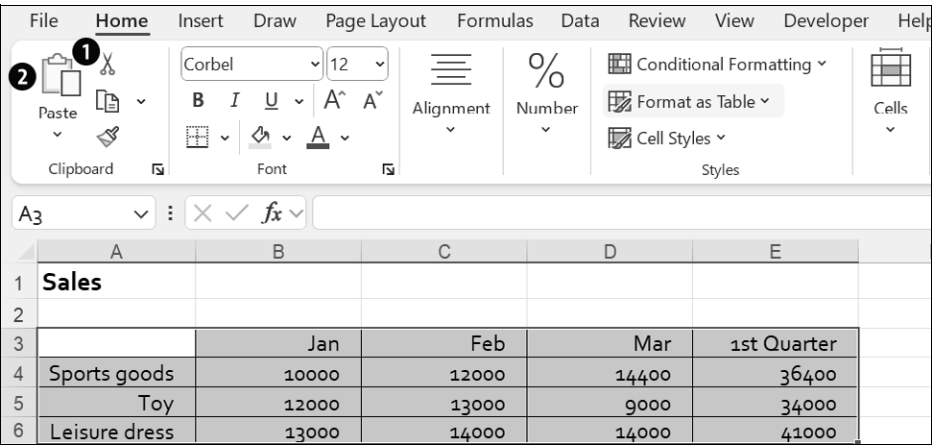
1. Select the range.
2. Hold down the **Alt** key and drag the range by its border to the tab of the sheet where you want to place it.
3. The sheet becomes active, and you can drop the selected range where you want it.

In Excel, you can use a mouse to move cells beyond the active workbook. To drag a range from one workbook to another, arrange both workbook windows so their sheet tabs are visible and then drag the selected cell range by its border directly into the other workbook.

Moving with the Clipboard

It's usually easier to move large ranges with **Cut** and **Paste**. These commands use the Windows clipboard, and the quickest way to use them is with the **Cut** and **Paste** buttons in the **Home • Clipboard** group or by pressing **Ctrl** + **X** and **Ctrl** + **V**:

1. Select the cell range you want to move and use **Cut** ❶. Excel will copy the selected data to the clipboard and outline the selection with a moving border.
2. Select the upper-left cell of the paste range or the entire paste range. Overlaps with the source range are allowed if the target is the corner cell or a range of the same size. If the target range is on another sheet, select that sheet tab, and if it's in another file, choose the appropriate window. You can adjust your selection until it's correct. To cancel the operation, press **Esc**.
3. Complete the move by pressing **Paste** ❷ or **Enter**.



If you need to make space in the paste range, right-click the target range and select **Insert Cut Cells**. This command is only available when cut data is in the clipboard. If there's more than one way to paste, a small dialog box appears, and you can use it to choose whether to shift the existing cell contents right or down at the paste location.

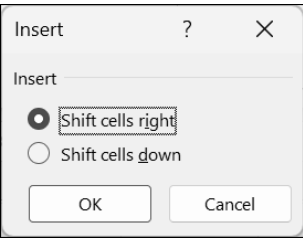


Figure 2.42 Insert Cells with Content Dialog Box

Moving with the Keyboard

If you don't use a mouse, you can move cells by using the keyboard. To do this, select the area and press **Shift + Delete**, then set the active cell to the top-left corner of the paste area and confirm with **Enter**.

Moving on the Touchscreen

In **Touch input** mode, you can easily stretch or resize ranges. However, you can't move them with your finger, but you can use the clipboard method as follows:

1. Touch the selected range until the context menu appears.
2. Tap **Cut**.
3. Hold your finger on the corner cell of the target area and then select **Paste** from the context menu.

The target range stays selected thereafter, so you can quickly apply more commands.

If you're using a Surface Pen, you can use the tip like a mouse pointer to drag a selected cell range to a new location. At the target spot, a context menu appears offering **Move here** along with other options, and this menu is the same as the one that appears when you drag a selection while holding the right mouse button (look ahead to Figure 2.53).

2.6.2 Copying to Adjacent Cells

There are several ways to copy cells, which you'll often need to do when copying a value or formula into neighboring cells.

We've already covered copying with the fill handle or the **AutoFill** icon on the touchscreen, but you can also use the icons under **Home • Editing • Fill**. To do this, first select the range with the content to copy and the target range as a block, then pick the icon with the desired copy direction from the **Fill** menu. If you want to copy a single cell's value only into the cell to the right or below, just select the empty target cell and then click the corresponding arrow icon.

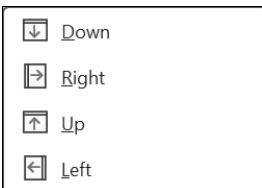


Figure 2.43 Direction Arrows in Fill Menu

To copy with a mouse, select the cell you want to copy and drag the fill handle across the cells in the row or column you want to fill. You can also copy multiple cells at once, whether they're in a row, column, or cell range.

The section on data series explained that when you drag the fill handle or the **AutoFill** icon, Excel looks for a chance to create a series—and if it can't, it simply copies the content. This happens with formulas, single numbers, and text—unless the text includes a counter at the start or end. Even if you can create a series, you can still use the **Copy Cells** auto-fill option to copy only; alternatively, you can hold down the **Ctrl** key while dragging.

2.6.3 Copying with Reference to the Adjacent Column

When copying formulas, it's especially useful to copy a cell's content down as far as the adjacent column extends. A typical example is shown in Figure 2.44. Here, you add the values from three months each time. You create the first formula, keep the cell selected, and double-click the fill handle—and the formula will copy down as far as there are values in column D.

	A	B	C	D	E
1	Sales				
2					
3		Jan	Feb	Mar	1. Quarter
4	Sports goods	10000	12000	14400	36400
5	Toy	12000	13000	9000	34000
6	Leisure dress	13000	14000	14000	41000
7					

Figure 2.44 Copying First Row Sum by Double-Clicking

2.6.4 Copying to Nonadjacent Cells

To copy data to nonadjacent cells, you can use the mouse within the worksheet. Select the original cells and drag the border while holding down the **[Ctrl]** key, and then, when you release, the copy appears in the new location. If the target area extends beyond the visible screen, drag slightly past the scroll bar and the screen will scroll until you release the mouse button.

	A	B	C	D	E
1	Sales forecast				
2					
3	2025	Boston	New York	Philadelphia	Alabama
4	Product group 1				
5	Product group 2				
6					
7					
8					
9					
10					
11					

Figure 2.45 Copying Labels

2.6.5 Copying and Pasting

By default, copying overwrites the target range, but you can also create space for the copy beforehand. While dragging the selection frame, hold down both the **[Shift]** and **[Ctrl]** keys and the mouse pointer will change to an I-beam. Then, position it precisely between the columns or rows where you want to insert new cells filled with data from

the source range. If the I-beam is on a column boundary, existing data shifts right; if it's on a row boundary, the data shifts down.

2.6.6 Copying to Other Sheets or Workbooks

In Excel, you can copy cells beyond the active worksheet by using a mouse. To copy a range to another sheet, follow these steps:

1. Select the range.
2. Hold down the **[Alt]** and **[Ctrl]** keys, then drag the range's frame to the tab of the sheet where you want to place the copy.
3. The sheet will become active, and you can move the selected range to the desired location.

To copy a range from one workbook to another, drag the selected cell range by its border into the other workbook. Just hold down **[Ctrl]** while doing this.

Disabling Drag and Drop

You can disable the **Enable fill handle and cell drag-and-drop** option under **File • Options • Advanced • Editing options**. This is helpful if you want to prevent inexperienced users from experimenting in completed workbooks.



2.6.7 Copying via the Clipboard

As with moving, you can choose to use the clipboard when copying. Typically, you use the **Copy 1** and **Paste 2** buttons in the **Home • Clipboard** group or press the **[Ctrl] + [C]** and **[Ctrl] + [V]** keyboard shortcuts. The **[Ctrl] + [Shift] + [V]** shortcut pastes only the value without formatting.

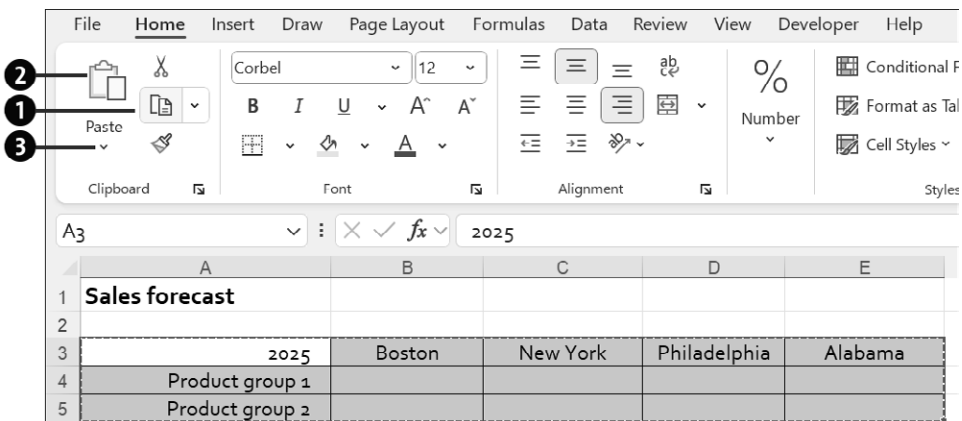


Figure 2.46 Copying Selection to Clipboard

Clicking the arrow ❸ at the bottom of the **Paste** button opens a detailed menu of paste options in Excel. The unique feature here is that the icons not only visually indicate the paste options but also show a preview of the result at the paste location.

To review which paste option works best, hover the mouse pointer over the icons or hold the pen above them. The paste action only happens when you click or tap an icon. If you do that, then at the end of the target area, an icon appears offering the same paste options, thus allowing you to correct the action if you accidentally choose the wrong one. Press **[Enter]** to finish and clear the selection of the source area with the marching-ants border.

Clicking the first icon under **Paste** inserts the copied cells entirely, clicking the second inserts only formulas, clicking the third inserts formulas and number formats, and clicking the fourth preserves the original formatting. In the second row, there's an icon that doesn't carry over existing borders from the source range, an icon that applies the source range's column width to the target range, and an icon that "flips" the table by swapping columns and rows, as shown in the preview in Figure 2.47.

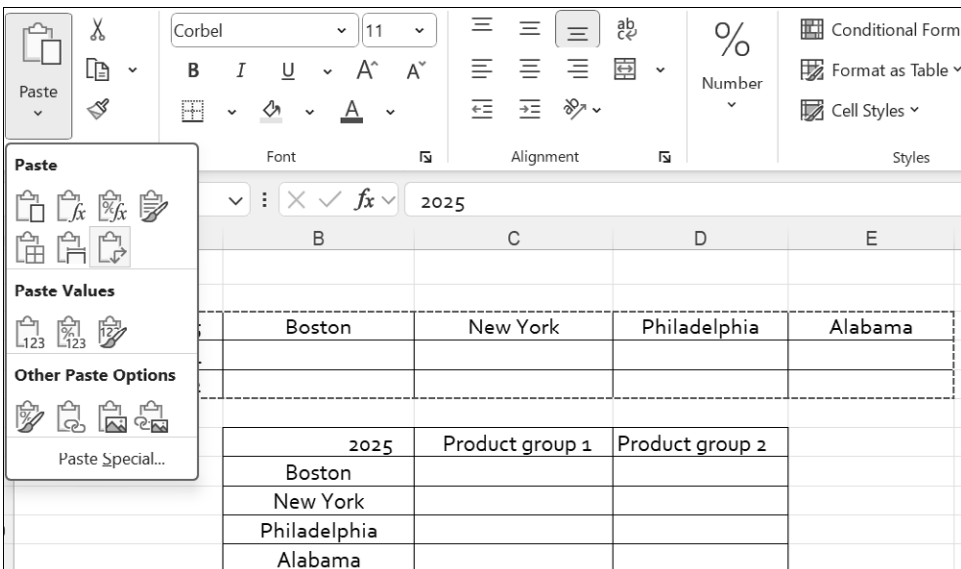


Figure 2.47 Preview for Transpose Option

The second group of icons is labeled **Paste Values**. Clicking the first icon pastes only the values into the target range (which is useful when you want to copy values instead of formulas), clicking the second pastes values along with the number format from the source range, and clicking the third pastes the entire format (including borders, background colors, and more).

The third group of icons, which is labeled **Other Paste Options**, initially offers an icon that applies only the formatting. The second icon links the source and target areas, so changes in the source are reflected in the target. (This topic is covered in detail in Chapter 3.) The third icon takes a snapshot of the copied area and inserts it as a graphic object into the worksheet, while the fourth icon creates a linked image of the source area. We will revisit this topic in Chapter 10.

Also included is the **Paste Special** option, which offers some of these choices in the dialog box. This dialog also offers a few useful operations, like applying calculations to the cells in a target range. You'll find more details in Chapter 5.

The **Skip blanks** option is also noteworthy. A common scenario is copying values from column B to column A, so for example, column B might contain some correction values for the current values in column A, but only for certain cells. When you copy values from B to A, the values in A remain unchanged where column B has no data.

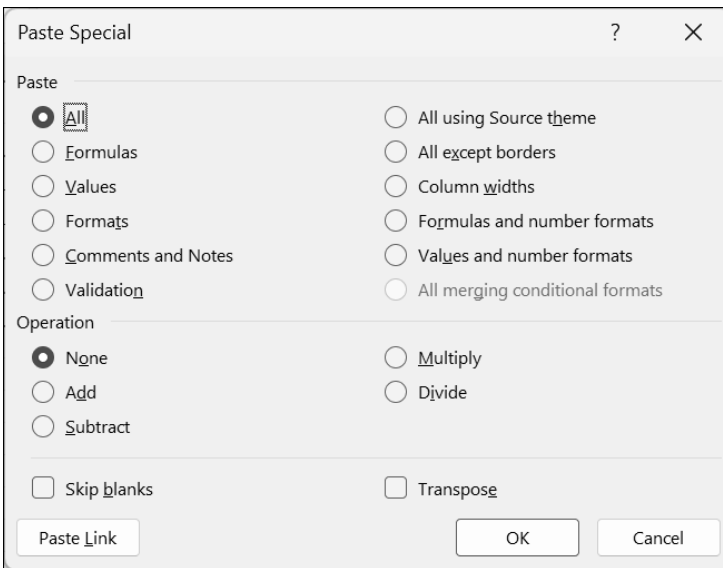


Figure 2.48 Paste Special Dialog

When you open the **Insert** button menu on a touchscreen in **Touch input** mode, Excel shows a vertical menu with larger spacing between options to make selecting commands easier (see Figure 2.49). However, live preview isn't available here, and since the **Paste Options** button usually appears after you paste with one of the options, you can quickly fix any paste mistakes and confirm the paste by pressing **Enter**. This menu is also arranged vertically.

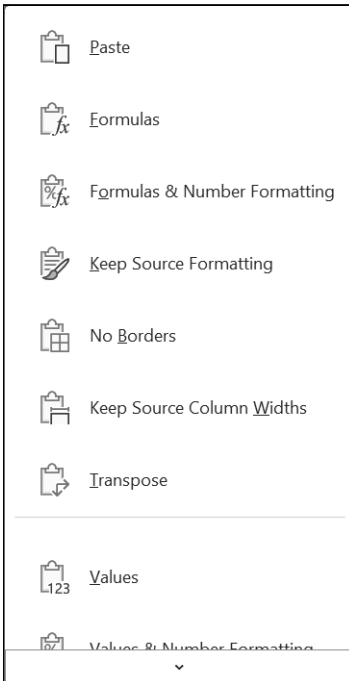


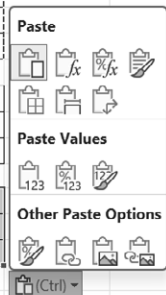
Figure 2.49 Menu for Paste Button on Touchscreen

Pasting Multiple Times from the Clipboard

The clipboard lets you paste stored data repeatedly into as many places as you want. To do this, follow these steps in order:

1. Select the cell or cell range you want to copy.
2. When you click **Copy**, Excel copies the selected data to the clipboard and highlights the selection with a marching-ants border.

	A	B	C	D	E	F	G
1	Sales forecast						
2							
3		Boston	New York	Philadelphia	Alabama		
4	Product group 1						
5	Product group 2						
6							
7		Boston	New York	Philadelphia	Alabama		
8	Product group 1						
9	Product group 2						
10							
11		Boston	New York	Philadelphia	Alabama		
12	Product group 1						
13	Product group 2						
14							
15							



3. Select the top-left cell or the entire range where you want to paste. If it's on another sheet, first select the appropriate sheet tab, or if it's in another file, switch to that window. You can adjust your selection until it's correct. To cancel, press `[Esc]`.
4. Paste the data from the clipboard by clicking the **Paste** button—without opening its menu. Excel will paste the entire cell range from the clipboard but still show the **Paste Options** button at the end of the pasted range, and clicking or tapping it will open a menu to adjust the paste method.
5. To paste another copy, select the next target range and paste again with **Paste**; otherwise, press `[Enter]` to finish.

If you find the **Paste Options** button distracting, you can disable it under **Cut, Copy, and Paste** in **File • Options • Advanced**.

When the target is a range rather than a single cell, Excel's behavior depends on the shape of the original range. Figure 2.50 shows some examples, with the original highlighted in gray.

	Fall	Fall	Fall	Fall	Fall														
Test		100	100	100	100														
Test		100	100	100	100														
Test		100	100	100	100														
Test		100	100	100	100														
Test		100	100	100	100														
Test		100	100	100	100														
Test																			
Test																			
	Company	Company	Company	Company	Company														
	Department	Department	Department	Department	Department														

Figure 2.50 Original and Copy/Copies

If the source area includes more than one cell, the target area must meet one of the following conditions:

- Only the top-left cell is specified as the target area. For single-column source areas, multiple start cells in a row are allowed, and for single-row source areas, multiple start cells in a column are allowed.
- The number of rows is the same.
- The number of columns is the same.
- The target range is the same size as the source area.
- The target range is large enough to be filled multiple times by the source range.

If none of these conditions are met, you will get an error message and should adjust the target range.

Creating Space When Inserting

If the target range already contains data, then you can shift the data at the insertion point to the right or downward. Instead of the **Insert** command, use the **Copied Cells** option from the target range's context menu. In the dialog box, select whether to shift the existing data at the insertion point to the right or down.

Copying Multiple Ranges

Although the **Cut** command isn't available for multiranges, you can copy them using the clipboard. However, there are limitations. The parts of the multirange must share a common dimension—either width or height. They must also be aligned parallel, which means that they must start in the same row if they share the same height or in the same column if they share the same width. When you paste them, the subareas are inserted side by side or stacked vertically. Figure 2.51 shows an example of this.

	A	B	C	D	E	F	G
3	Product number	Product name	Category	Net price		Product name	Net price
4	7777	Louvre Ccxs	Louvre	\$120.00		Louvre Ccxs	\$120.00
5	5556	Rollo BT 33	Rollo	\$100.00		Rollo BT 33	\$100.00
6	8444	Awning Blue Sk	Awning	\$99.00		Awning Blue Sk	\$99.00
7	8443	Louvre VVx	Louvre	\$88.00		Louvre VVx	\$88.00
8	8666	Rollo Dark	Rollo	\$110.00		Rollo Dark	\$110.00

Figure 2.51 Copying with Multiple Selections

2.6.8 Copying to Multiple Sheets

A special copying option is available when you select multiple sheets at the same time. In this case, you can copy a selected range in the active sheet simultaneously to the corresponding ranges in the other selected sheets. To do this, you group the sheets that belong to the sheet group, select the cell range to copy, copy it to the clipboard, and then simply use the **Home • Editing • Fill • Across Sheets** command. In the small dialog box, you can choose to copy the cell content, the format, or both.

Moving and Copying Using the Context Menu

The options for moving, copying, and pasting are also available through the context menus of the selected cell ranges. The menu for the selected source range lets you disable the paste commands, and the menu for the target range shows visual paste options and includes the previously mentioned **Paste copied cells** option.

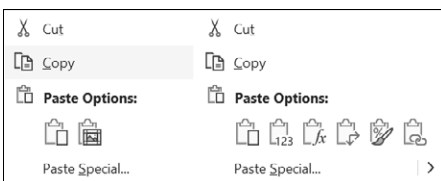


Figure 2.52 Context Menus for Source and Target Ranges

An advanced context menu is also available for mouse users. To access it, select the cells you want to move or copy, place the cell pointer on the frame, and then drag the auxiliary frame to the target position while holding the right mouse button. The menu shown in Figure 2.53 will then appear there.

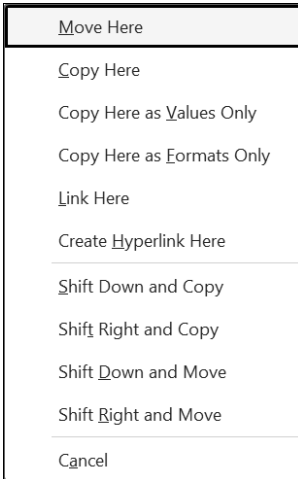


Figure 2.53 Context Menu for Moving and Copying

On the touchscreen, the **Paste**, **Cut**, and **Copy** commands are found in the horizontal section of the context menu.

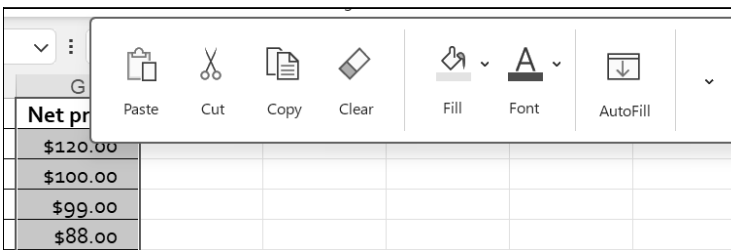


Figure 2.54 Commands for Copying, Cutting, and Pasting on Touchscreen

2.6.9 Copying Multiple Ranges at Once

Another helpful feature when building calculation models is the advanced Office clipboard, which can store up to 24 items. It complements the Windows clipboard, which holds only one item at a time.

If you keep the **Clipboard** task pane open—a click or tap on the dialog box launcher in the lower right corner of the **Clipboard** group will open it—all the items you copy or cut will be listed there. You can also hide the window by using the **Options** button in the task pane and selecting **Collect Without Showing Office Clipboard**, and you can track copied items via an icon in the taskbar.

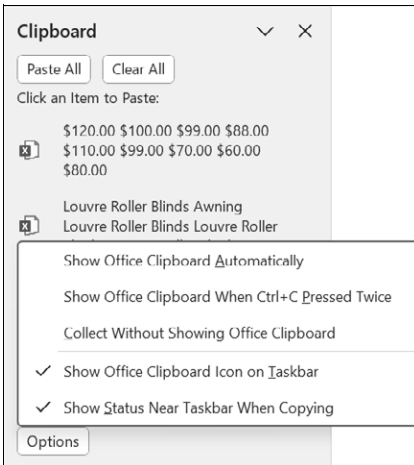
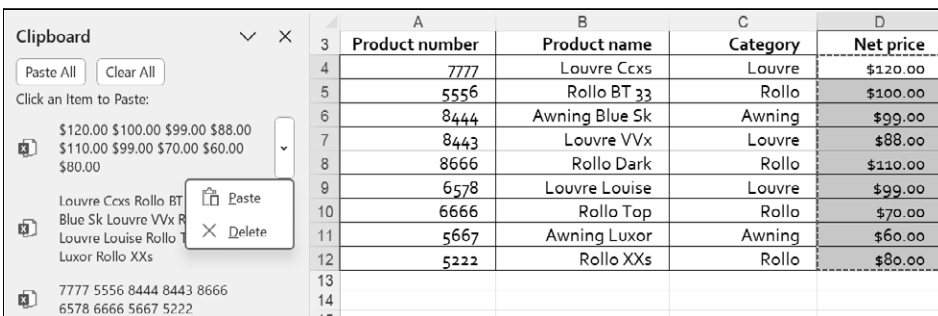


Figure 2.55 Clipboard Task Pane and Its Options

Suppose you want to copy columns from a table and paste them elsewhere as a block. Follow these steps:

1. Select the columns one by one, using the **Copy** command each time.
2. If you use the **Copy** command multiple times, Excel automatically opens the **Clipboard** pane based on the setting you choose via the **Options** button. This pane displays the current items on the Office Clipboard, showing the first part of each snippet along with a small menu for each item.
3. Select the cell where you want to paste the first item, then click or tap that item. Repeat this for the remaining items.
4. Finally, it's a good idea to clear the Office Clipboard completely using the **Clear All** button to start fresh for your next tasks.

You can delete individual items by using the small menu you can open with the button on the right edge. If the clipboard already holds 24 items, the first one will be replaced by the new item. The **Paste All** button lets you combine multiple stored items in a new location. Also note that Excel stacks the cell ranges vertically, so you might need to do some editing afterward.



2.6.10 Copying Formats

As mentioned earlier, when copying cell ranges, you can handle content and format separately. By default, Excel copies content and format together, which works well in most cases. But sometimes, it's helpful to copy a format separately—either to empty cells before entering data or to cells that already contain data.

If you want to expand a table by three columns and apply the format of the last column, then select that column and drag the fill handle or the **AutoFill** icon to the right across the columns you want to format. After that, click the **Auto Fill Options** button and choose **Fill Formatting Only**. This removes any copied content and keeps only the formatting. Similar options will appear when you're inserting rows.

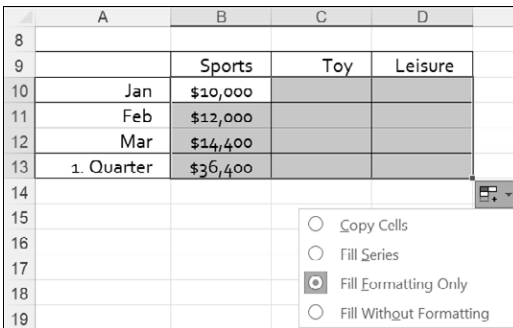


Figure 2.56 Copying Formats

Using the Format Painter

A convenient way to copy formats anywhere is by using the brush button, which is located in the **Home • Clipboard** group under **Format Painter**. You can click this button to apply the active cell's format to the next cell or cell range you select, and the mouse pointer will change to a cross with a paintbrush as long as you hold it. You can also double-click the button to use the format painter repeatedly until you click it again, and if you use this command often, you should consider adding it to the Quick Access Toolbar. You can also use the paintbrush icon in **Touch input** mode by tapping the button and then tapping the cell that should adopt the format of the selected cell or cell range.

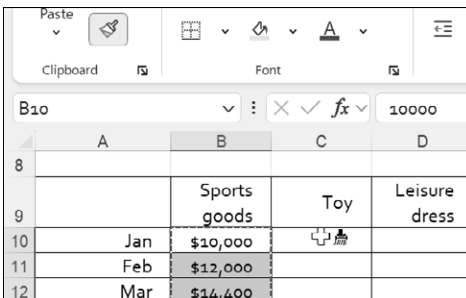


Figure 2.57 Formatting with Paintbrush Icon

2.6.11 Transposing When Copying

Transposing is a special way to copy data that we briefly mentioned earlier. It converts data arranged in columns into rows and data in rows into columns, which effectively flips or mirrors the table. The mirroring point is always the upper-left corner of the selected range. While Excel's PivotTables offer powerful ways to rearrange data, the **Transpose** option remains useful. For instance, if a table has become too wide, you can easily flip it this way.

To demonstrate this feature, we'll use a simple quarterly report as an example. The data for each product group is arranged in a single row, and you can flip this layout so the values for each product group appear in columns. Here's how you do it:

1. Select the entire table range and copy it to the clipboard.
2. Select the corner cell of the new table and choose the **Transpose** option from the **Paste** menu.
3. Press **[Esc]** to cancel the selection of the original range.

	A	B	C	D	E
1	Sales				
2					
3		Jan	Feb	Mar	1. Quarter
4	Sports goods	\$10,000	\$12,000	\$14,400	\$36,400
5	Toy	\$12,000	\$13,000	\$9,000	\$34,000
6	Leisure dress	\$13,000	\$14,000	\$14,000	\$41,000
7					
8		Sports goods	Toy	Leisure dress	
9	Jan	\$10,000	\$12,000	\$13,000	
10	Feb	\$12,000	\$13,000	\$14,000	
11	Mar	\$14,400	\$9,000	\$14,000	
12	1. Quarter	\$36,400	\$34,000	\$41,000	

Figure 2.58 Transposing Tables

2.6.12 Deleting and Inserting Cells

You can not only clear a cell's content and formatting but also delete the cell itself. However, this description isn't precise: The contents of surrounding cells just shift to close the gap left by the deletion. So if you delete cell B3 in the example, Excel will initially act as if B3 no longer exists—and the formula in C3, which previously referenced B3, will lose that reference and show the error message **#REF!**. The cell will also display a corresponding error indicator, which means the reference is broken, but if you re-enter the reference to B3, the formula will work correctly again.

When you delete a column, all columns to the right shift one column to the left. The same applies to rows: rows below shift upward.

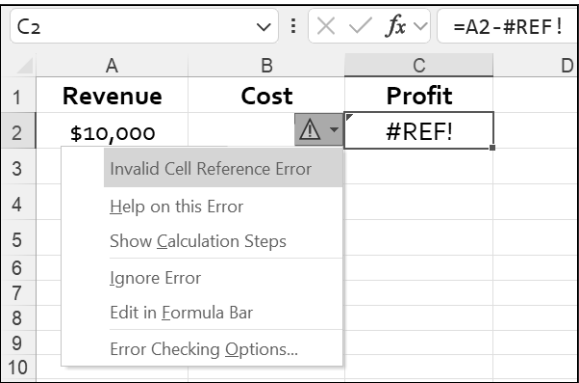


Figure 2.59 Note After Losing Reference

You can also use a mouse to delete cells. Select the range of cells you want to delete, position the mouse pointer over the fill handle, and hold down the **[Shift]** key. The mouse pointer will change to a double-headed arrow with two crossbars, and you can drag it into the selection until the entire area is filled with the grid. Be mindful of the direction you drag. If you drag upward, the cells below the selection move up, and if you drag to the left, the cells to the right of the selected area shift left. You can also delete entire rows or columns this way. To do this, select the row or column headers, hold down the **[Shift]** key, and drag the fill handle into the selection.

To delete selected cell ranges with your finger, tap the selection, tap the arrow at the end of the horizontal section in the context menu, and choose **Delete Cells** in the vertical section.

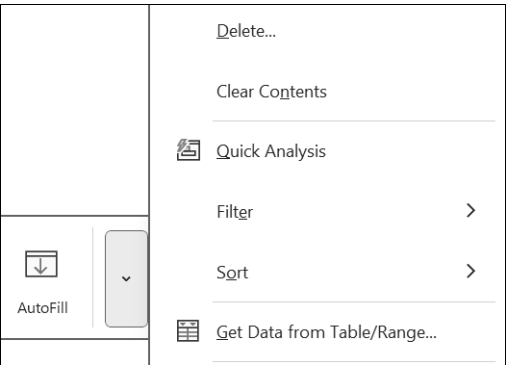


Figure 2.60 Two-Part Context Menu on Touchscreen

Delete Command for Cells

You can also find the delete command for cells under **Home • Cells • Delete • Delete Cells** in the ribbon. Select the range and then use the **Delete Cells** command to opens a dialog box where you can choose to shift surrounding cells left or upward. You can also delete

entire rows or columns that the selection touches, and this is faster if you select the row or column headers first and then run the command. In this case, the dialog box prompt is skipped.

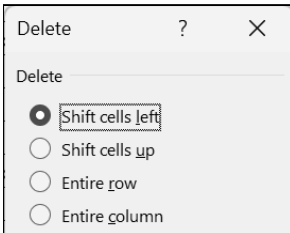


Figure 2.61 Deleting Cell Ranges

Inserting Cells

Inserting cells, rows, and columns works much like deleting them with a mouse, and the main difference is that you drag the mouse pointer out of the selected area. Suppose you enter values in a column and realize after a few entries that you accidentally missed one. All the following values will be one cell too high, so you fix the problem by selecting the last correct value and then dragging the fill handle down one cell while holding down the **Shift** key.

3		
4	Sports goods	
5	Toy	
6	Leisure dress	
7		

Figure 2.62 Inserting Cells with Mouse

The mouse pointer will then change back to a double arrow with two horizontal lines. When you release the mouse button, an empty cell will appear below the originally selected cell and all other cells in the column will shift down by one. You can also insert multiple cells by dragging down the same number of cells, and you can create empty cells to the right of the selected cell as well.

Adding Rows and Columns

The straightforward way to insert entire rows or columns is to use the row or column headers, just like when deleting them. First, select the row below where you want to insert new rows or the column next to where you want to insert new columns to the right. Then, hold down the **Shift** key and drag the fill handle down or to the right. Finally, extend the frame across multiple rows or columns to insert several rows or columns. By default, Excel applies the formatting of the selected cells to the new cells when you paste.

After you finish pasting, the **Paste Options** button appears and lets you choose whether the new cells should adopt the formatting from the cells above or below or if the formatting should be cleared entirely (see Figure 2.63).



Figure 2.63 Context Menu for Inserting Rows

Commands, icons, and keyboard shortcuts for pasting are also available. In this case, unlike when you're pasting with a mouse, when you first select the cell below or to the right of the paste location, you select the exact cell range to clear for the new cells. If you select **Home • Cells • Insert • Insert Cells**, a small dialog box appears (see Figure 2.64). You can also open this dialog box by using the **Ctrl** + **+** keyboard shortcut.

In this dialog box, you can choose whether to shift existing cells right or downward at the insertion point, and you can use the **Entire row** and **Entire column** options to insert full rows or columns at the insertion point. Alternatively, you can select row or column headers and then choose **Insert Cells** from the context menu.

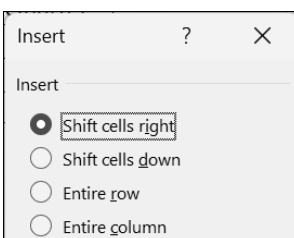


Figure 2.64 The Insert Cells Dialog Box

Also, instead of choosing the **Insert Cells** option, you can choose the **Insert Sheet Rows** or **Insert Sheet Columns** options directly from the **Insert** button menu. As you did when deleting rows and columns, you need to consider how inserting affects hidden parts of the table. Usually, formulas are unaffected and range addresses adjust automatically—and when multiple sheets are selected, cells are inserted into all of them.

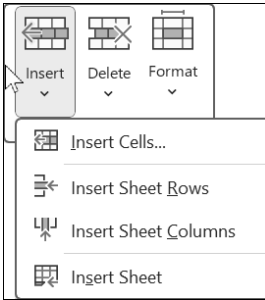


Figure 2.65 Insert Commands Menu

2.6.13 Adjusting Column Width

Excel creates new sheets with a default column width, and if that width isn't enough, you can adjust the width of individual columns, groups of columns, or all columns at once. You can also change the default width so that all columns with unchanged widths get a new default width. Alternatively, you can let Excel automatically adjust the width of the selected columns, and Excel will base this adjustment on the longest entry in each column.

You can also use column width changes to temporarily hide columns, and you do this by setting the column width to zero. Hiding columns is safer than deleting them because Excel keeps the data and allows you to unhide it. To change the width of one or multiple columns, simply select one cell per column in any row. You can also select the column headers.

Resizing by Dragging

A quick but less precise way to adjust column width is to drag the right edge of the column header left or right with your mouse. A guide line will appear to help you see whether the cell contents fit, and if you select multiple columns—even nonadjacent ones—all selected columns will resize evenly.

To do this on a touchscreen, drag the column boundary using your finger on the round handles or use a pen on the edge of the column header after tapping it.

	A	B
1	Sales	
2		
3		Jan
4	Sports goods	\$10,000
5	Toy	\$12,000
6	Leisure dress	\$13,000
7		
8		

Figure 2.66 Widening Columns on Touchscreen

To adjust all columns at once, click or tap the **Select All** box and drag the edge of any column header with your mouse. All columns will adopt the same width, regardless of their previous size. On a touchscreen, open the context menu on a column header and select **Column Width**, which will appear when you tap the arrow at the end.

The Format Command

To set exact widths, use the **Home • Cells • Format** command and select **Column Width**. Enter a value between 0 and 255 here to specify how many characters should fit in the column. This value always refers to the selected default font and size. You can also work with decimal places here.

You can use the **Format • Default Width** command for two different purposes. First, you can reset the width of columns that have been changed to the current default width or a new default width. To do this, include those columns in your selection. Second, if you select a column that hasn't been resized instead of one that has, you can adjust all untouched columns to a new default width while leaving the others unchanged.

To set the optimal column width, double-click or tap the right edge of the column header. This method corresponds to the **Format • AutoFit Column Width** command, and please note that it can cause unwanted results if the column contains headers that are longer than the other entries. If it does, then it's usually better to let the header extend into the adjacent cell and adjust the column width manually.

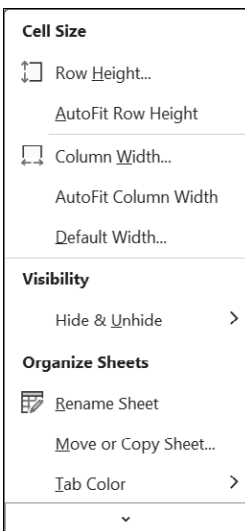


Figure 2.67 Changing Column Width Using Format Command

2.6.14 Hiding and Unhiding Columns

If certain columns aren't relevant to a specific task or if some users shouldn't see data in a given column, then you can hide those columns from view and printing. To do this,

drag the column header border left until the column disappears. You can also do this with a finger or stylus on a touchscreen, and a double line between column headers indicates the spot.

Alternatively, you can use the context menu. Right-click or press and hold the selected column headers to open a menu with the **Hide** command. The touchscreen menu arranges most commands horizontally, with only those behind the arrow shown vertically. If you select two column headers with hidden columns between them, you can unhide those columns via the context menu. You can also find these commands under **Format • Visibility • Hide & Unhide**.

2.6.15 Changing the Row Height

Excel sets the default row height to fit the chosen default font at the selected size. When a larger font is used in a row, the row height adjusts automatically, and if the font size is reduced, then the row returns to its default height.

You can also change the height of individual rows, groups of rows, or all rows at the same time. You can also let Excel automatically optimize the height of selected rows, and the program will adjust them based on the largest font in each row. You can also use row height changes to temporarily hide rows. To change the height of one or more rows, simply select one cell per row in any column. You can also select the row headers.

Dragging Row Borders

The quickest way to change the row height is to drag the bottom edge of the row header up or down with your mouse. The current point and pixel count appears as you drag, and if you select multiple rows—including noncontiguous ones—then all will resize evenly. On a touchscreen, tap the row header and drag its border to the desired position. To set the optimal height for a selected row, double-click or double-tap the bottom edge of its header.

Commands for Adjusting Row Height

The last step corresponds to the **Format • AutoFit Row Height** command. To change the height of all rows, click or tap the **Select All** box. To ensure uniform row heights, use the **Format • Row Height** command and enter a value between 0 and 409 points (a *point* is a unit of measure used for font size).

2.6.16 Hiding and Unhiding Rows

Rows can be hidden just as easily as columns. To hide a row, drag its bottom border upward until it disappears.

Alternatively, you can use the context menu to hide rows. Right-click or press and hold selected row headers with your finger or pen to open a menu with the **Hide** command,

and if you select two row headers with hidden rows between them, you can unhide those rows from the context menu.

2.7 Efficient Workbook Management

To make a workbook a useful tool and organizational aid, you need to arrange the sheets in a clear order. This order might be chronological, with cost sheets for each month; spatial, by department or sales region; or type based, by personnel category or topic. Multiple well-organized workbooks are better than one large, cluttered one, and tables linked by formulas should be grouped into the same workbook whenever possible.

2.7.1 Workbooks as Organizational Tools

One advantage of using workbooks is that you don't need to load the related documents in them separately. Workbooks also make it easier to share documents because it's much simpler to share one workbook than a collection of separate files. Workbooks also support collaborative editing of tables, which makes it easy to create and maintain a consistent table layout across multiple tables in a workbook.

You can create workbooks in various ways. You can either start with a set number of sheets or let the workbook grow by adding sheets over time, and you can also insert sheets from other workbooks at any time.

2.7.2 Adding Worksheets

If the sheets in your workbook aren't enough, you can add new ones anytime. To add standard sheets at the end of your workbook, simply click the  button to the right of the sheet tabs.



Figure 2.68 New Sheet Button

Alternatively, you can use the **Home • Cells • Insert • Insert Sheet** command. To insert a sheet between existing ones or choose a different sheet type, right-click the sheet before which you want to insert the new sheet or press and hold the tab with the finger until the context menu appears. Then, choose **Paste** from the context menu, which will open a dialog box with two tabs.

To add a new worksheet, select **Worksheet** on the **General** tab. You can also insert charts as separate sheets, and if you select data for the chart first, it will appear immediately on the new sheet.

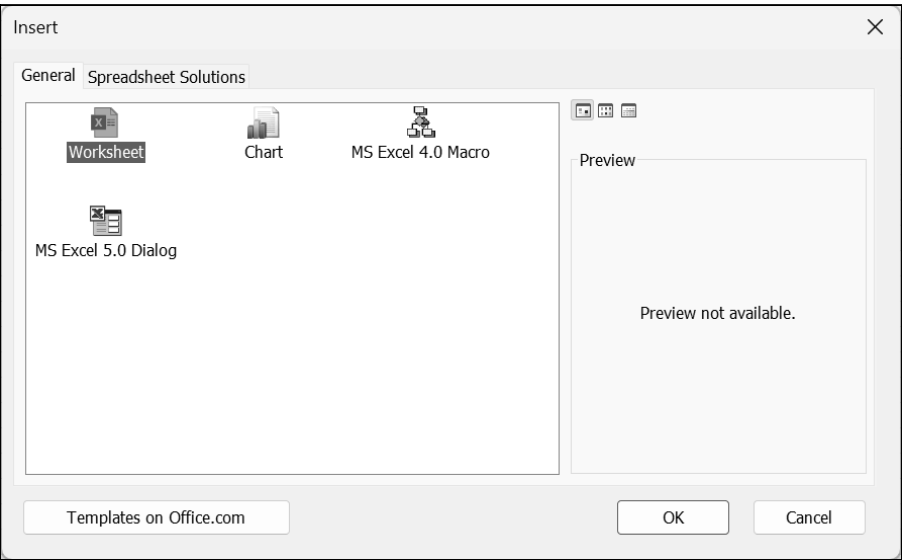


Figure 2.69 Insert Sheet Dialog

The dialog box also offers templates on the **Spreadsheet Solutions** tab. For example, you can insert an invoice form that's available as a template. Click the **Templates on Office.com** button to access Microsoft's template collection.

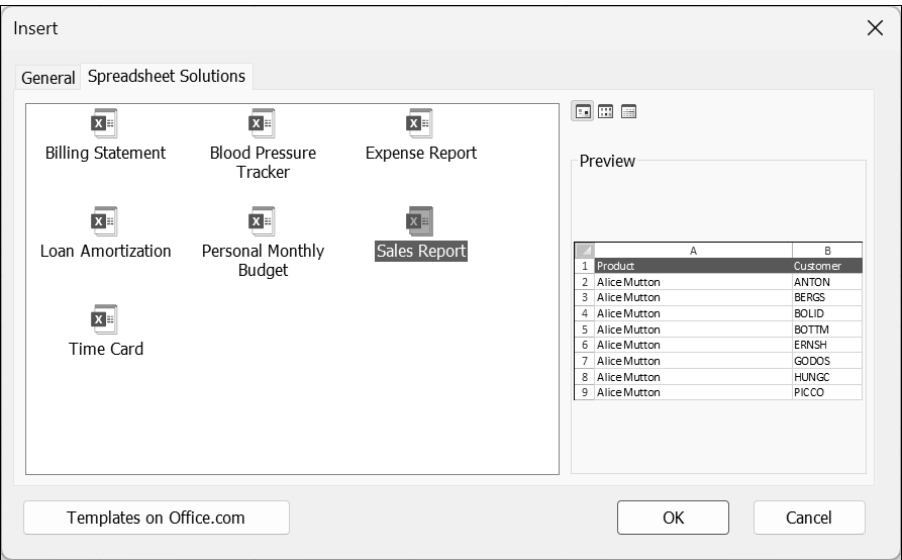


Figure 2.70 Spreadsheet Solutions Tab for Inserting Worksheets

Here's an example of a new sheet based on a template.

	A	B	C	D	E	
3		Company Name			INVOICE	
4						
5		Street Address, City, State, Zip/Postal Code				
6		Website, Email				
7		Phone				
8					Invoice No.: 10001 Invoice Date: 6/13/2025 Due Date: 6/13/2025	
9						
10		BILL TO:				
11		Contact Name			SHIP TO: Contact Name Client Company Name Address Phone	
12		Client Company Name				
13		Address				
14		Phone				
15						

Figure 2.71 New Sheet Based on Template

2.7.3 Inserting Windows

When you’re working with large workbooks, it can sometimes be helpful to use multiple windows to view sheets, when you’re doing things like comparing data across different sheets. To let you do this, Excel provides the **View • Window • New Window** command. When you select it, Excel opens a second application window and displays the current workbook there as well.

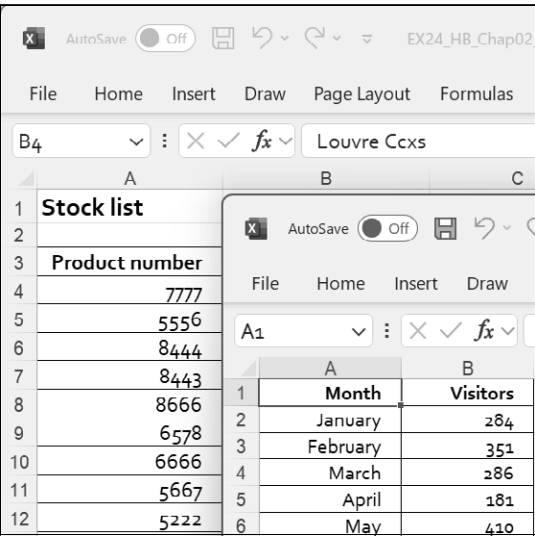


Figure 2.72 Example of Workbook Showing Different Sheets in Separate Windows

You can navigate independently in this new window, separately from the first. To differentiate them, Excel adds a number to the file name in the title bar. When you no longer need the extra window, close it using the **Close** icon.

2.7.4 Hiding Workbooks, Windows, or Sheets

You can hide individual workbooks, extra windows for a workbook, or individual sheets within a workbook during a session as needed. They stay in main memory so macros can still use them, and formula references to hidden tables also continue to work without any issues. However, you can't make manual changes to documents while they're hidden.

Hiding entire workbooks or extra windows for a workbook helps keep your workspace organized by showing fewer windows at once. To hide a workbook or an extra window, select it, then go to **View • Window • Hide** ❶.



Figure 2.73 Window Group on View Tab

If hidden workbooks or additional windows are open during a session, you can open a dialog box via **View • Window • Unhide** ❷ to select from a list of hidden workbooks or windows. You can unhide hidden workbooks or windows individually from there.

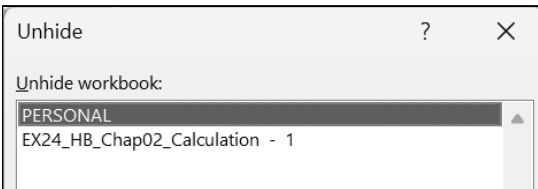


Figure 2.74 Unhide Hidden Workbooks

Hidden sheets are useful for storing named constants that formulas in visible sheets reference, such as VAT rates or exchange rates. To hide one or more sheets, select them and choose **Hide** from the context menu in the selected tabs.

To unhide sheets, right-click any sheet tab, select **Unhide**, and pick the sheet in the dialog box. To select multiple sheets, hold down **Ctrl** while clicking. You can also find these commands under **Home • Cells • Format • Hide & Unhide**.



Figure 2.75 Unhiding Hidden Sheets

2.7.5 Deleting Unnecessary Sheets

If you no longer need certain sheets, you can delete them anytime. However, deleting sheets may break cell references in formulas on other sheets, so you should only delete sheets that aren't referenced by formulas elsewhere in the workbook. Here's how you delete sheets:

1. Activate the sheet or select the sheets you want to delete.
2. From the context menu, choose **Delete**, or on the **Home** tab, select **Cells • Delete • Delete Sheet**.
3. If the sheets contain data, you'll be warned before deletion that this action is final. Click **Cancel** if you selected the wrong sheet by mistake.

2.7.6 Rearranging the Order of Sheets

To rearrange sheets, drag the sheet tabs with your mouse to the desired position. This works for a single sheet or a group of selected sheets. The mouse pointer changes to a small sheet or stack icon, and a small triangle shows where the sheets will be placed. When you select multiple nonadjacent sheets, they will be placed consecutively at the new location.

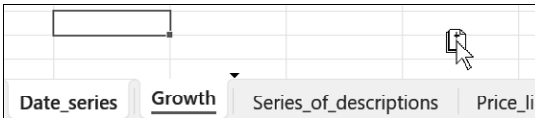


Figure 2.76 Moving Stack of Sheets

On a touchscreen, you can move sheets in **Touch input** mode by using the context menu and the **Move or Copy** command. The pen works like the mouse pointer.

2.7.7 Copying Sheets

Copying a table within a workbook is often useful, especially if it contains a form you want to reuse. First, select the sheet or sheets again, and then, while holding down the **Ctrl** key, drag the selection to where you want the copy to appear.

Excel automatically adds index numbers to new sheet names to avoid duplicates in the workbook, so it's best to replace these with appropriate names right away.

To move or copy sheets, you can use the tab's context menu and select **Move or Copy**, or you can go to **Home • Cells • Format** and choose **Move or Copy Sheet**. In the dialog box, select where to insert the copy under **Insert before:**. To create a copy, check **Create a copy**. You can also select other workbooks or a new workbook as the destination from the **To book:** list box.

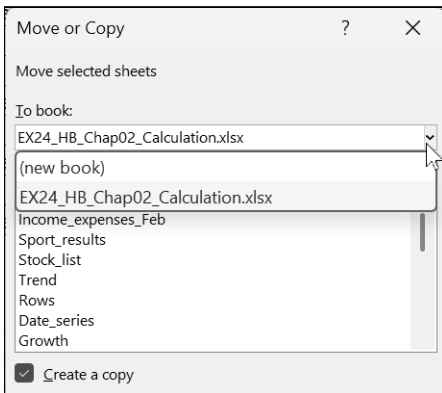


Figure 2.77 Dialog Box for Copying or Moving Sheets



Quickly Rearranging Workbooks

Suppose you've created several workbooks but you don't like their organization anymore because many sheets are in the wrong workbook. To quickly solve this problem, open two or more workbooks and then select one of the options under **View • Window • Arrange All** so all workbook tabs are visible at once. Then, simply drag the tabs with your mouse into the workbook where the sheets belong.

2.7.8 Navigating Large Worksheets

When you compare a table on paper to one on a screen, the paper table—if large enough—has an advantage that's been hard to replicate on screen. Specifically, when you're viewing a large paper table, your gaze can shift to any spot on it in a fraction of a second—but on a screen, you often need to scroll the visible area across the entire table. Despite the availability of scroll bars, mouse movements, and useful keyboard shortcuts, scrolling can be a tedious task, especially on small monitors.

Zooming

The **Zoom** feature offers a solution, with a dedicated slider at the bottom right corner of the window. Dragging the slider or clicking the **+** or **–** icon uniformly enlarges or reduces the grid and its contents within the window. In addition, you can click the percentage display to open the **Zoom** dialog box, and you can also open the dialog by selecting **View • Zoom • Zoom**.

Excel offers various zoom levels to choose from (see Figure 2.78). You can use **Fit selection** to adjust a previously selected area to fill the entire active window, and you can also zoom continuously. To do the latter, under **Custom**, set zoom percentages between 10% and 400% of the original size.

You can also zoom by using the mouse wheel if the **Zoom on roll with IntelliMouse** option is enabled under **File • Options • Advanced** in **Editing options**. Once you've zoomed the table, you can continue editing it as usual. This function doesn't affect the table's printout because print scaling is controlled through the settings under **File • Print** or the options in the **Page Setup** dialog box.

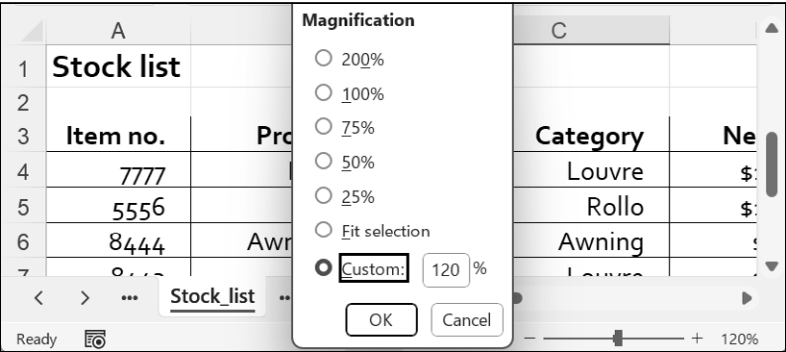


Figure 2.78 Zoom Slider and Zoom Dialog

On a touchscreen, you can zoom in or out by touching the screen with two fingers and spreading them apart or pinching them together.

Freezing Labels

When you're working with large worksheets, you might not see the column and row labels when you scroll the view. Freezing labels helps here. In this example, you'll freeze the first column and the first three rows. Place the cell pointer in cell B4, just to the right of the column(s) and below the row(s) you want to keep visible when scrolling, and then choose **View • Window • Freeze Panes • Freeze Panes**. Clicking this button opens a menu that also lets you freeze only the top row or the first column (see Figure 2.79).

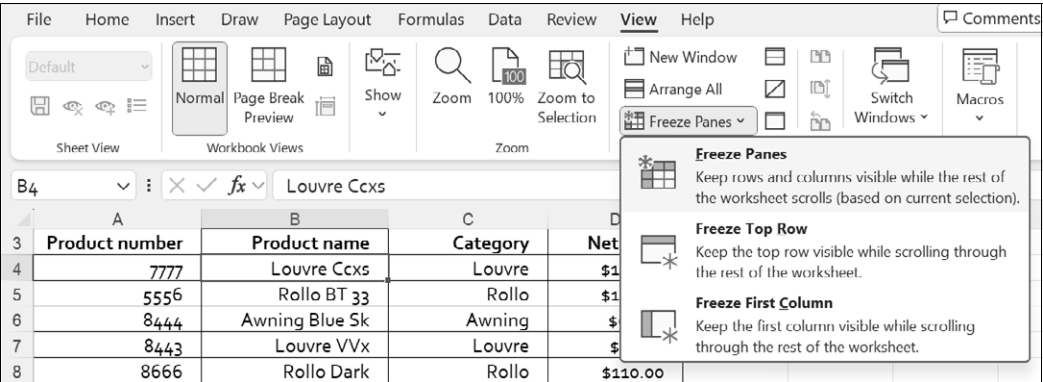


Figure 2.79 Freezing Table Headers

You can apply freezing only once per worksheet, and if you work with two or more large tables, it's best to spread them across multiple sheets. You can still move the cell pointer to the frozen areas to make changes. Note that freezing columns or rows doesn't affect printing. To achieve a similar effect when printing, set the options under **Page Layout • Page Setup • Print Titles** and specify the rows or columns to repeat on each printed page. To unfreeze panes, go to **View • Window • Freeze Panes • Unfreeze Panes**.

2.7.9 Navigation

The **Navigation** task pane helps you maintain an overview in large workbooks and quickly access specific sheets, tables, PivotTables, images, and diagrams. You open this area via **View • Show • Navigation**.

Clicking the arrow next to a sheet name lists the named ranges, tables, and diagrams inside it. Click or tap an item to select it in the workbook, and if you know its name, you can find it by using the search box. You can rename, hide, or delete images and diagrams through the element's context menu.

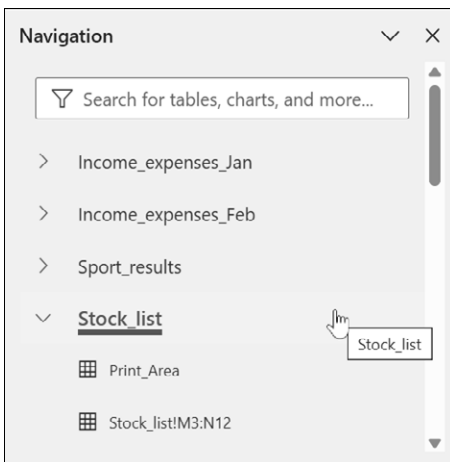


Figure 2.80 Sheets, Named Ranges, and Diagrams in Navigation Area

2.7.10 Defining Worksheet Views

A worksheet can contain data meant for different audiences. Not everyone needs the same data layout or should see all the data, so for example, in a sheet with purchase and sales prices, you might want to hide purchase prices in one case and sales prices in another when printing a list. Each named view can hide different columns or rows in the worksheet, and you can also set different column widths or row heights for each view. Other options you can specify include the following:

- Screen settings, like turning off gridlines or page break lines
- Highlighted cells

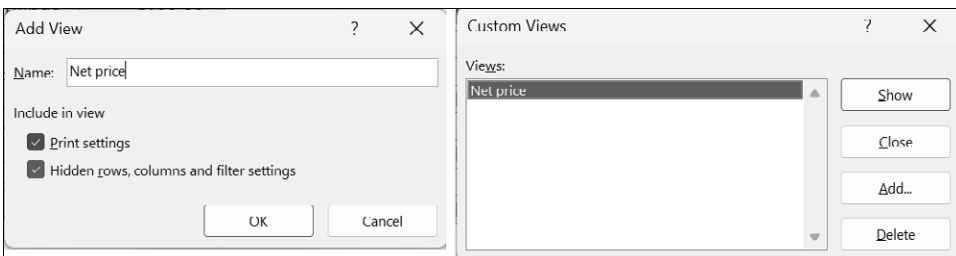
- Window size and position
- Window panes
- Fixed rows and columns
- Filter settings for data lists
- Defining a print area or other print settings

However, there's a major limitation: The workbook cannot contain any areas that are formatted as tables. This significantly reduces the feature's usefulness. The **Custom Views** button will then be disabled.

2.7.11 Defining a View

To define a view, follow these steps:

1. Activate the sheet for which you want to create a view. (Views for groups of sheets are not supported.)
2. Choose the display configuration and print settings you want to apply to this view.
3. Click the **View • Workbook Views • Custom Views** button, which will bring up a dialog box that displays a window on the left showing any previously defined views. Clicking the **Add** button opens another dialog box.
4. Enter a name for the current view. Multiword names are allowed.
5. You can also check or leave unchecked two boxes that specify whether to save the print settings and the hidden rows/columns and filter settings that are included in the current view.



Once you define a view, you can display it anytime. To do this, select the name in the dialog box under **Views** and then click **Show**. When working with views, it's usually best to define the table's "Normal View" as one of the available views first.

2.7.12 Views in Shared Workbooks

When users are collaborating on a workbook, Excel lets each user customize table views individually—applying filters, sorting, conditional formatting, or hiding columns.

To create your first view, prepare the table accordingly, go to **View • Table View**, and select **New Table View** ❶. The text box will show **Temporary View** instead of **Standard View**, and if you're sure the view is useful, you can use **Keep Table View** ❷ to save it in the workbook, where it will be named **View1**. Otherwise, choose **End Table View** ❸. After saving the first view, use the **Table View Options** button to manage and switch between views ❹. Row and column headers will display in a different color ❺ to highlight the views, and the sheet tab will show an eye icon ❻.

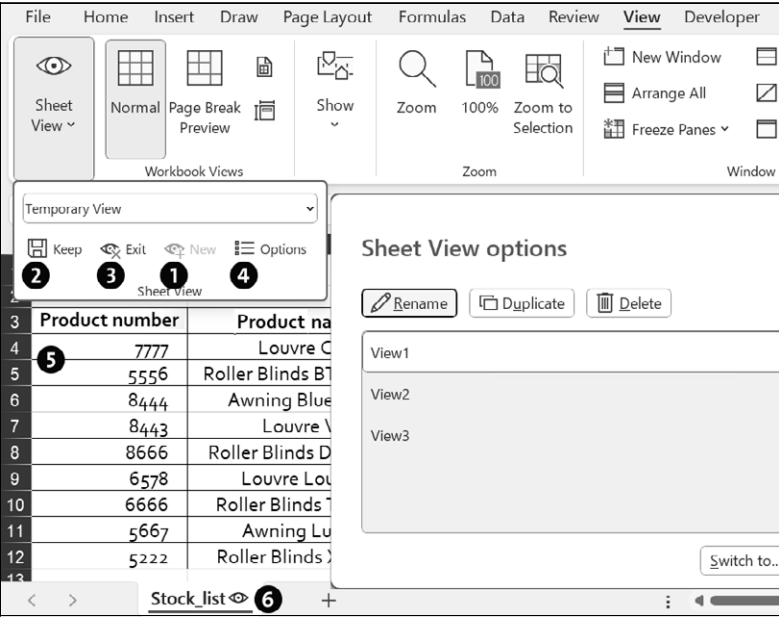


Figure 2.81 Tools for Table Views in Shared Workbooks

2.7.13 Notes and Comments

The more complex a calculation model, the more essential proper documentation of it becomes. It should always make clear how calculation results are produced. This helps you maintain the model and is even more important to others who use or develop it further. You also need to consider regulations that ensure calculations can be audited, such as in accounting.

By consistently naming key table areas clearly and using range names in formulas, a workbook largely documents itself. If that's not enough, you can add necessary information about the entire table, specific calculation methods, and notes on data maintenance and updates in an easily accessible part of the table.

Text Passages and Text Boxes

Excel offers many options for this, and a common method is to add explanatory text in free cell ranges or on a separate sheet in the workbook. Since a cell can hold over 30,000

characters and cells can be merged, it's easy to insert explanatory text directly into the worksheet. Figure 2.82 shows a text passage next to a table where a block of cells has been merged into a single cell.

	A	B	C	D	E	F	G
1	Customer Classification						
2							
3	Customer	Revenue	Classification				
4	Berger	600	C		Customers with a revenue of more than \$ 5000 are classified in B, customers over \$ 50000 in A..		
5	Wehner	1200	B				
6	Brech	220000	A				
7	Schub	60000	A				
8	Schleimin	20000	B				
9	Vosken	900	C				
10	Erben	1300	B				

Figure 2.82 Text in Expanded Cell

For shorter texts, you can also use a text box you create with the **Text Box** button in the **Insert • Text** group. Drag the box to the desired size with your mouse, and when you release the button, you can type text directly into the box. The text automatically wraps within the fixed frame, and you can click a cell outside the text box to end text input.

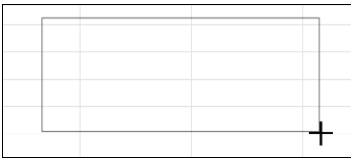


Figure 2.83 Drawing Text Box

You can move these text boxes independently of the table data. If a text box contains instructions for editing the table, like rules for correct data entry, you can move it anywhere on the worksheet where you're working.

Working with Notes and Comments

For individual cells, notes and comments are ideal for explaining the table. Notes attached to a cell usually appear when you hover your mouse pointer over that cell. Here's a brief example of the income-expense calculation from Section 2.1.

Jan-25			
Expenditure			
Rent and other housing expenses	\$3,000.00	Helmut Vonhoegen: Insurance Tax Consumption	
Expenses for car	\$500.00		
Public transport expenses	\$250.00		
Insurance premiums	\$600.00		
Contractually fixed savings rates	\$400.00		
Interest and repayment rates	\$340.00		

Figure 2.84 Note on Entered Value

Entering a Note

To add extra information to your table, enter a new comment as follows:

1. Select the cell where you want to add a note. (If you select a range, the note indicator will attach to the first cell.)
2. Go to **Review • Notes • New Note** or press **[Shift] + [F2]**. Excel will open a text box and insert the user's name at the top. This is especially helpful when collaborating on tables.
3. Enter your note directly into the cell, the formula, or elsewhere.
4. Close the note by clicking or tapping outside the field.

To correct something, select **Edit Note** from the cell's context menu. Then, place the cursor where you want to insert text or drag to select text you want to replace. To finish editing, choose **Exit Text Editing** from the note's context menu. The note box will remain selected.

To move the note box away from the cell, drag its frame in the desired direction. The arrow pointing to the small red triangle will adjust accordingly. Resize the note box by dragging the handles on its frame.

To help you work efficiently with notes, the **Review • Notes** group offers options to navigate existing notes, show or hide them, or convert them into comments. The context menu of a cell with a note provides the **Edit Note**, **Delete Note**, and **Show/Hide Note** commands.

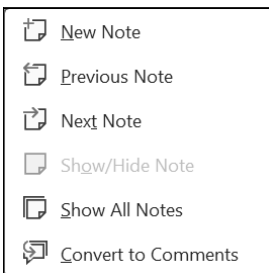


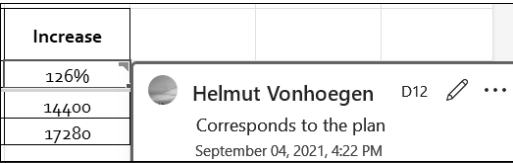
Figure 2.85 Notes Group

Working with Comments

Comments are especially useful when users are collaborating on spreadsheets—when multiple people contribute data to a sheet or review it, or when they must consider specific details during data entry. Unlike simple notes, comments are designed to start a *thread*—which is a conversation with others. They're especially useful when you share a workbook and collaborate with others. Read more about this in Chapter 14.

Adding comments to a cell or cell range works much like adding notes. Follow these steps:

1. Select the cell where you want to add a comment. (If you select a range, the comment indicator will attach to the first cell.)
2. Go to **Review • Comment • New Comment**, where Excel opens a text box and inserts the user's name at the top. This is especially helpful when you're collaborating on tables.
3. Enter your comment directly in the cell, formula, or elsewhere, and close the comment by clicking or tapping the arrow.
4. A reply box will immediately appear where you can respond to the original comment. The ellipses menu lets you delete the thread entirely or resolve it by closing the discussion without deleting it. The pencil icon lets you edit the comment.



5. Click the **Comments** button above the ribbon to open the **Comments** pane, where all comment threads appear separately from the sheet (see Figure 2.86). Comments stay hidden on the sheet until you close the pane.

The context menu of the cell with a comment then offers the **Reply** and **Delete Comment** commands.

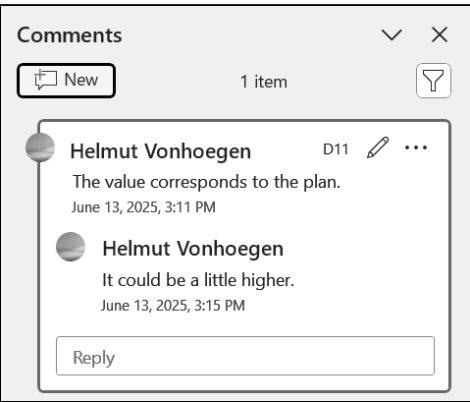


Figure 2.86 Comments Pane

The **Review** group's **Comments** section offers several icons to help you easily navigate, show, hide, or delete comments.

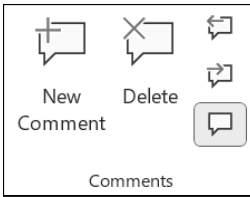
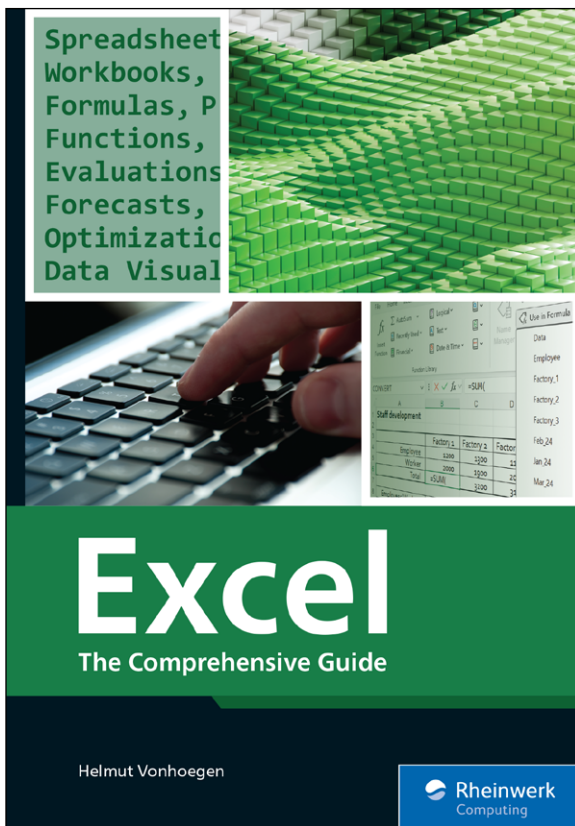


Figure 2.87 Comments Group

You can also print comments and notes along with your table data. In the **Page Setup** dialog box, go to the **Sheet** tab, and under **Print • Comments and Notes**, choose whether to print them at the end of the sheet or as they appear on the sheet. The latter option applies only to notes. You can open this dialog box via the launcher in the **Page Layout** group • **Page Setup**.

You can easily disable the display of notes and comments if you no longer need them. To do this, go to **File • Options • Advanced**, and then, under **Display**, select **No comments, notes, or indicators**.



Helmut Vonhoegen

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