LEARNING MADE EASY

7th Edition

Microsoft® 365

Excel® Formulas & Functions

for dummies®

A Wiley Brand

Dig into the catalog of Excel formulas

Pick the function that handles your needs

Build financial functions and manage statistics

Ken Bluttman

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by Ken Bluttman

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Microsoft® 365 Excel® Formulas & Functions For Dummies®, 7th Edition

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Contents at a Glance

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Introduction

Excel worksheets are used in many walks of life: business, education, home finances, and even hobbies (such as keeping track of your baseball-card collection). In my house, we use Excel for a lot, from our taxes (boring!) to our ever-growing recipe collection (yummy!). Often, I use Excel in place of a calculator. After all, Excel is like a calculator on steroids!

In the workplace, Excel is one of the most commonly used analysis and reporting tools. Financial statements, sales reports, inventory, project scheduling, customer activity — so much of this stuff is kept in Excel. The program's capability to manipulate and give feedback about the data makes it attractive. Excel's flexibility in storing and presenting data is like magic.

About This Book

This book is about the number-crunching side of Excel. Formulas are the keystone to analyzing data — that is, digging out nuggets of important information. What is the average sale? How many times did we do better than average? How many days are left on the project? How much progress have we made? These sorts of things.

Formulas calculate answers, straight and to the point. But that's not all. Excel has dozens of built-in functions that calculate everything from a simple average to a useful analysis of your investments to complex inferential statistics. But you don't have to know it all or use it all; just use the parts that are relevant to your work.

This book discusses more than 150 of these functions. But rather than just show their syntax and list them alphabetically, I assemble them by category and provide real-world examples of how to use them alone, and in formulas, along with step-by-step instructions and illustrations of the results.

Within this book, you may note that some web addresses break across two lines of text. If you're reading this book in print and want to visit one of these web pages, simply key in the web address exactly as it's noted in the text, pretending as though the line break doesn't exist. If you're reading this as an e-book, you've got it easy — just click the web address to be taken directly to the web page.

Foolish Assumptions

I assume that you have a PC with Excel loaded. That's a no-brainer! Nearly all the material is relevant for use with earlier versions of Excel as well. I also assume that you know how to navigate with a keyboard and mouse. Last, I assume that you have used Excel before, even just once. I do discuss basics in Chapter 1 but not all of them. If you really need to start from scratch, I suggest that you read the excellent *Excel All-in-One For Dummies,* by Paul McFedries and Greg Harvey (Wiley).

Other than that, this book is written for the Microsoft 365 version of Excel, but just between you and me, it works fine with older versions of Excel. There can be a function or two that isn't in an older version or works slightly differently. But Microsoft has done an excellent job of maintaining compatibility between versions of Excel, so when it comes to formulas and functions, you can be confident that what works in one version works in another.

Icons Used in This Book

This book uses icons in the margins to grab your attention. Here's a guide to what the icons mean:


TIP

The Tip icon highlights information that'll make your life easier — at least when it comes to Excel.


REMEMBER

The Remember icon marks some basic concept that you'll want to keep tucked away somewhere in your brain.


WARNING

As it implies, the Warning icon is used for serious stuff. This icon tells you to be careful — usually because you can accidentally erase your data or some such horrible event.


TECHNICAL STUFF

Once in a while, some tidbit is interesting to the tech-head types but not to anyone else. I mark these paragraphs with the Technical Stuff icon. You can read these items or ignore them as you see fit.

Beyond the Book

In addition to the material in the print or e-book you're reading right now, this product also comes with some access-anywhere goodies on the web. Be sure to check out the free online Cheat Sheet to find the Excel order of operations, Excel cell references worth remembering, common Excel error messages, and more. To get the Cheat Sheet, simply go to `www.dummies.com` and type **Excel Formulas & Functions For Dummies Cheat Sheet** in the Search box.

Where to Go from Here

Roll up your sleeves, take a deep breath, and then forget all that preparing-for-a-hard-task stuff. Using Excel is easy. You can hardly make a mistake without Excel's catching it. If you need to brush up on the basics, go to Chapter 1. That chapter is also the best place to get your first taste of formulas and functions. After that, it's up to you. The book is organized more by area of focus than anything else. If finance is what you do, go to Part 2. If working with dates is what you do, go to Part 4. Seek, and you will find.

1

Getting Started with Excel Formulas and Functions

IN THIS PART . . .

Get to know formula and function fundamentals.

Discover the different ways to enter functions.

Understand array-based formulas and functions.

Find out about formula errors and how to fix them.

IN THIS CHAPTER

- Getting the skinny on the Excel basics
- Writing formulas
- Working with functions in formulas

Chapter 1

Tapping into Formula and Function Fundamentals

Excel is to computer programs what a Ferrari is to cars: sleek on the outside and a lot of power under the hood. Excel is also like a truck. It can handle all your data — lots of it. In fact, in Excel, a single worksheet has 17,179,869,184 places to hold data. Yes, that's what I said — more than 17 *billion* data placeholders. And that's on just *one* worksheet!

TIP

The number of available rows and columns may be fewer depending on how much memory your computer has.

Excel is used in all types of businesses. And you know how that's possible? By being able to store and work with any kind of data. It doesn't matter whether you're in finance or sales, whether you run an online e-commerce store or organize wilderness trips, or whether you're charting party RSVPs or tracking the scores of your favorite sports teams — Excel can handle all of it. Its number-crunching ability is just awesome! And so easy to use!

Just putting a bunch of information on worksheets doesn't crunch the data or give you sums, results, or analyses. If you just want to store your data somewhere, you can use Excel or get a database program instead. In this book, I show you how to build formulas and how to use the dozens of built-in functions that Excel provides. That's where the real power of Excel is — making sense of your data.

Don't fret that this is a challenge and that you may make mistakes. I did when I was ramping up. Besides, Excel is very forgiving. Excel usually tells you when you made a mistake, and sometimes it even helps you correct it. How many programs do that? But first, the basics. This first chapter gives you the springboard you need to use the rest of the book. I wish that books like this were around when I was introduced to computers. I had to stumble through a lot of this.

Working with Excel Fundamentals

Before you can write any formulas or crunch any numbers, you have to know where the data goes and how to find it again. I wouldn't want your data to get lost! Knowing how worksheets store your data and present it is critical to your analysis efforts.

Understanding workbooks and worksheets

In Excel, a *workbook* is the same as a file. Excel opens and closes workbooks, just as a word processor program opens and closes documents. When you start up Excel, you are presented with a selection of templates to use, the first one being the standard blank workbook. Also there is a selection of recent files to select from. After you open a new or already created workbook, click the File tab to view basic functions such as opening, saving, printing, and closing your Excel files (not to mention a number of other nifty functions to boot!). Figure 1-1 shows the contents presented on the Info tab.


TIP

The default Excel file extension is `.xlsx`. However, you may see files with the older `.xls` extension; these older files work fine in the latest version of Excel. You may also see Excel files with the `.xslm` extension; those are fine to use, too.

Start Excel and double-click the Blank Workbook icon to create a new blank workbook. When you have more than one workbook open, you pick the one you want to work on by clicking it on the Windows Taskbar.

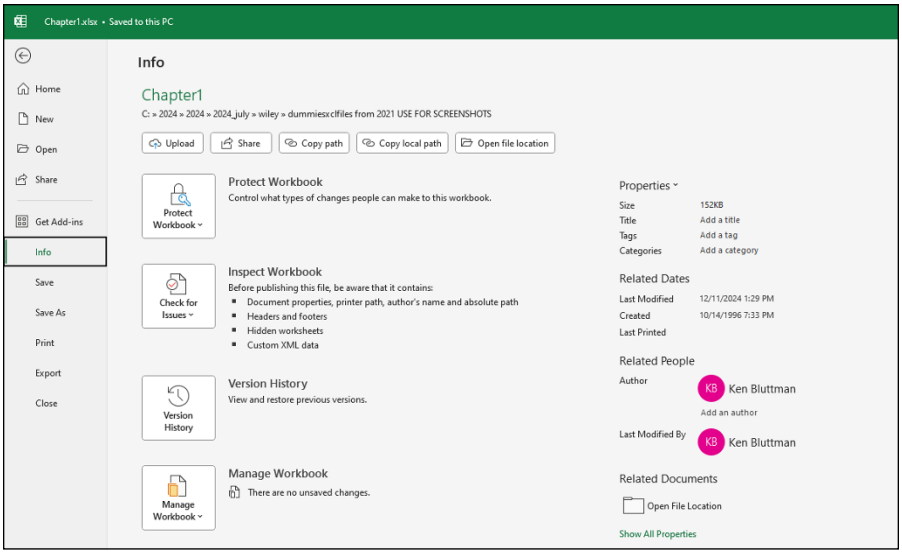


FIGURE 1-1: The Info tab shows details about your Excel file.

A worksheet is where your data actually goes. A workbook contains at least one worksheet. If you didn't have at least one, where would you put the data? Figure 1-2 shows an open workbook that has two sheets, aptly named Sheet1 and Sheet2. To the right of these worksheet tabs is the New Sheet button (looks like a plus sign), used to add worksheets to the workbook.

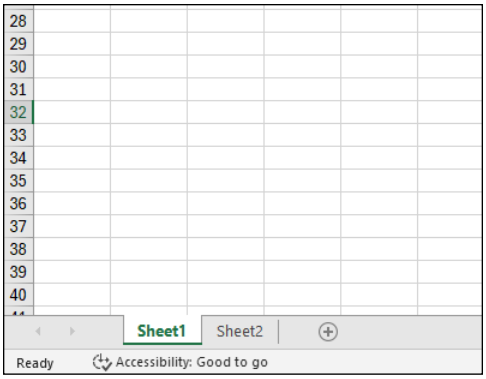


FIGURE 1-2: Looking at a workbook and worksheets.

At any given moment, one worksheet is always on top. In Figure 1-2, Sheet1 is on top. Another way of saying this is that Sheet1 is the *active* worksheet. There is always one and only one active worksheet. To make another worksheet active, just click its tab.

TIP

Worksheet, *spreadsheet*, and just plain old *sheet* are used interchangeably to mean the worksheet.

What's really cool is that you can change the name of the worksheets. Names like Sheet1 and Sheet2 are just not exciting. How about Baseball Card Collection or Last Year's Taxes? Well, actually, Last Year's Taxes isn't too exciting, either.

The point is, you can give your worksheets meaningful names. You have two ways to do this:

- Double-click the worksheet tab and then type a new name.
- Right-click the worksheet tab, select Rename from the menu, and then type a new name.

Press Enter to complete the name change.

Figure 1-3 shows one worksheet name already changed and another about to be changed by right-clicking its tab.

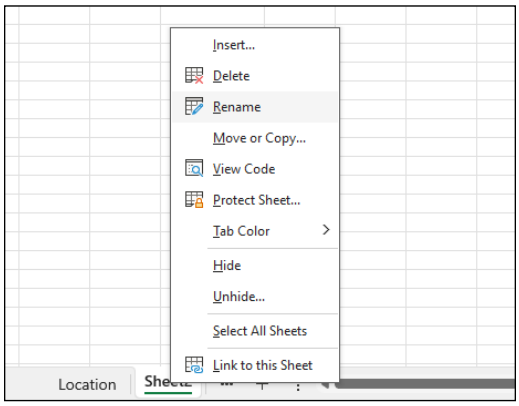


FIGURE 1-3: Changing the name of a worksheet.

You can try changing a worksheet name on your own. Do it the easy way:

1. **Double-click a worksheet's tab.**
2. **Type a new name and press Enter.**

   The name cannot exceed 31 characters.

TIP

You can change the color of worksheet tabs. Right-click the tab and select Tab Color from the menu. Color coding tabs provides a great way to organize your work.

To insert a new worksheet into a workbook, click the New Sheet button, which is located after the last worksheet tab. Figure 1-4 shows how. To delete a worksheet, just right-click the worksheet's tab and select Delete from the menu.

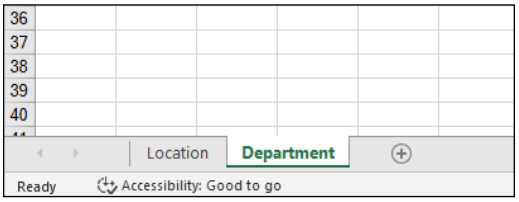


FIGURE 1-4: Inserting a new worksheet.

WARNING

Don't delete a worksheet unless you really mean to. You cannot get it back after it is gone. It does not go into the Windows Recycle Bin.

You can insert many new worksheets. The limit as to how many is based on your computer's memory, but you should have no problem inserting 200 or more. Of course, I hope you have a good reason for having so many, which brings me to the next point.

Worksheets enable you to organize your data. Use them wisely and you will find it easy to manage your data. For example, say that you are the boss (I thought you'd like that!), and over the course of a year you track information about 30 employees. You may have 30 worksheets — one for each employee. Or you may have 12 worksheets — one for each month. Or you may just keep it all on one worksheet. How you use Excel is up to you, but Excel is ready to handle whatever you throw at it.

TIP

You can set how many worksheets a new workbook has as the default. To do this, click the File tab, click Options, and then click the General tab. Under the When Creating New Workbooks section, use the Include This Many Sheets spinner control to select a number.

Introducing the Formulas tab

Without further ado, I present the Formulas tab of the Ribbon. The Ribbon sits at the top of Excel. Items on the Ribbon appear as menu headers along the top of the Excel screen, but they actually work more like tabs. Click them and no menus appear. Instead, the Ribbon presents the items that are related to the clicked Ribbon tab.

Figure 1-5 shows the top part of the screen, in which the Ribbon displays the items that appear when you click the Formulas tab. In the figure, the Formulas tab is set to show formula-based methods. At the left end of the tab, functions are categorized. One of the categories is opened to show how you can access a particular function.

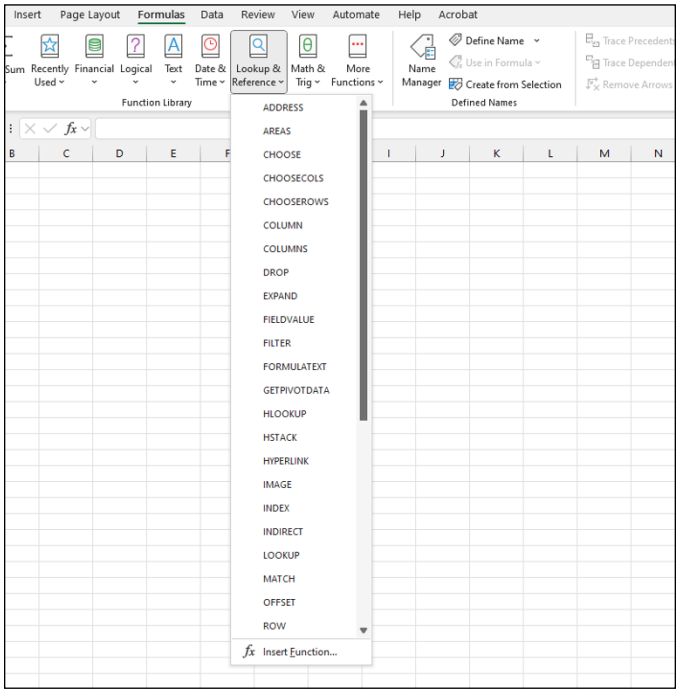


FIGURE 1-5: Getting to know the Ribbon.

These groups are along the bottom of the Formulas tab:

- **Function Library:** This includes the Function Wizard, the AutoSum feature, and the categorized functions.
- **Defined Names:** These features manage named areas, which are cells or ranges on worksheets to which you assign a meaningful name for easy reference.
- **Formula Auditing:** These features are for checking and correcting formulas. Also here is the Watch Window, which lets you keep an eye on the values in designated cells, but within one window. In Figure 1-6 you can see that a few cells have been assigned to the Watch Window. If any values change, you can see this in the Watch Window. Note how the watched cells are on sheets that are not the current active sheet. Neat! By the way, you can move the Watch Window around the screen by clicking the title area of the window and dragging it with the mouse.

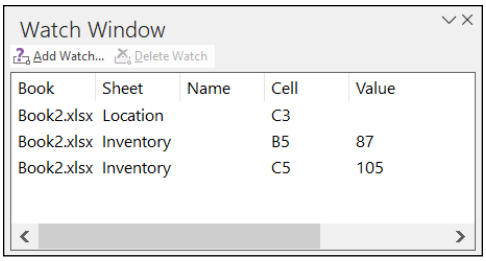


FIGURE 1-6: Eyeing the Watch Window.

» **Calculation:** This is where you manage calculation settings, such as whether calculation is automatic or manual.

TIP

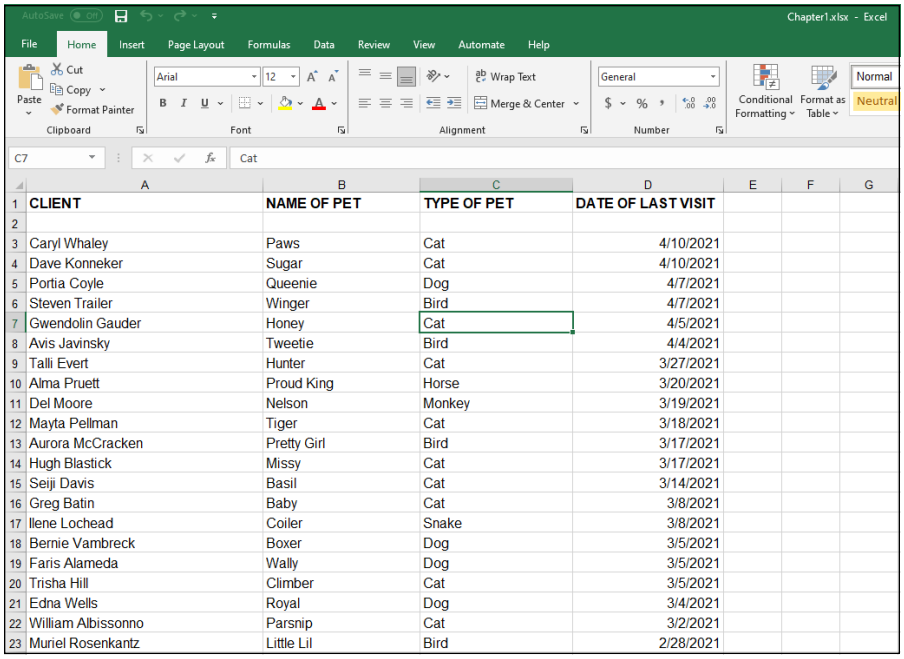
Another great feature that goes hand in hand with the Ribbon is the Quick Access Toolbar. (So there is a toolbar after all!) In Figure 1-5, the Quick Access Toolbar sits just above the left side of the Ribbon. On it are icons that perform actions with a single click. The icons are ones you select by using the Quick Access Toolbar tab in the Excel Options dialog box. You can put the toolbar above or below the Ribbon by clicking the Customize Quick Access Toolbar drop-down arrow on the Quick Access Toolbar and choosing an option. In this area, too, are the other options for the Quick Access Toolbar.

Working with rows, columns, cells, ranges, and tables

A *worksheet* contains cells. Lots of them. Billions of them. This may seem unmanageable but actually it's pretty straightforward. Figure 1-7 shows a worksheet that contains data. Use this to look at a worksheet's components. Each *cell* can contain data or a formula. In Figure 1-7, the cells contain data. Some, or even all, cells can contain formulas, but that's not the case here.

Columns have letter headers — A, B, C, and so on. You can see these listed horizontally just above the area where the cells are. After you get past the 26th column, a double lettering system is used — AA, AB, and so on. After all the two-letter combinations are used up, a triple-letter scheme is used. Rows are listed vertically down the left side of the screen and use a numbering system.

You find cells at the intersection of rows and columns. Cell A1 is the cell at the intersection of column A and row 1. A1 is the cell's *address.* There is always an *active* cell — that is, a cell in which any entry would go into should you start typing. The active cell has a border around it. Also, the contents of the active cell appear in the *Formula Box.*



	A	B	C	D	E	F	G
1	CLIENT	NAME OF PET	TYPE OF PET	DATE OF LAST VISIT			
2							
3	Caryl Whaley	Paws	Cat	4/10/2021			
4	Dave Konneker	Sugar	Cat	4/10/2021			
5	Portia Coyle	Queenie	Dog	4/7/2021			
6	Steven Trailer	Winger	Bird	4/7/2021			
7	Gwendolin Gauder	Honey	Cat	4/5/2021			
8	Avis Javinsky	Tweetie	Bird	4/4/2021			
9	Talli Evert	Hunter	Cat	3/27/2021			
10	Alma Pruett	Proud King	Horse	3/20/2021			
11	Del Moore	Nelson	Monkey	3/19/2021			
12	Mayta Pellman	Tiger	Cat	3/18/2021			
13	Aurora McCracken	Pretty Girl	Bird	3/17/2021			
14	Hugh Blastick	Missy	Cat	3/17/2021			
15	Seiji Davis	Basil	Cat	3/14/2021			
16	Greg Batin	Baby	Cat	3/8/2021			
17	Ilene Lochead	Coiler	Snake	3/8/2021			
18	Bernie Vambreck	Boxer	Dog	3/5/2021			
19	Faris Alameda	Wally	Dog	3/5/2021			
20	Trisha Hill	Climber	Cat	3/5/2021			
21	Edna Wells	Royal	Dog	3/4/2021			
22	William Albissonno	Parsnip	Cat	3/2/2021			
23	Muriel Rosenkantz	Little Lil	Bird	2/28/2021			

FIGURE 1-7: Looking at what goes into a worksheet.

REMEMBER

When I speak of, or reference, a *cell*, I am referring to its address. The address is the intersection of a column and row. To talk about cell D20 means to talk about the cell that you find at the intersection of column D and row 20.

In Figure 1-7, the active cell is C7. You have a couple of ways to see this. For starters, cell C7 has a border around it. Also notice that the column head C is shaded, as well as row number 7. Just above the column headers are the Name Box and the Formula Box. The Name Box is all the way to the left and shows the active cell's address of C7. To the right of the Name Box, the Formula Box shows the contents of cell C7.

GETTING TO KNOW THE FORMULA BAR

Taken together, the Formula Box and the Name Box make up the Formula Bar. You use the Formula Bar quite a bit as you work with formulas and functions. The Formula Box is used to enter and edit formulas. The Formula Box is the long entry box that starts in the middle of the bar. When you enter a formula into this box, you can click the little check-mark button to finish the entry. The check-mark button is enabled only when you are entering a formula. Pressing Enter also completes your entry; clicking the X cancels the entry.