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BEYOND THE BASICS

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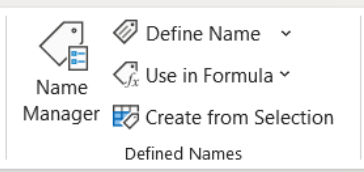
Microsoft Excel Beyond the Basics

Enhancing your proficiency in Excel can substantially increase your productivity and efficiency. By mastering advanced functions, PivotTables, and data visualization tools, you can convert raw data into comprehensive reports and dashboards. This enhancement not only improves your analytical abilities but also positions you as an asset in any data-driven organization.

Named Ranges

You can use the labels of columns and rows on a worksheet to refer to the cells within those columns and rows. Or you can create descriptive names to represent cells, ranges of cells, formulas, or constant values. Labels can be used in formulas that refer to data on the same worksheet; if you want to represent a range on another worksheet, use a name.

You can also create 3-D names that represent the same cell or range of cells across multiple worksheets.



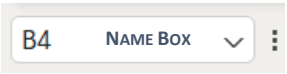
Guidelines for Names

- The first character of a name must be a letter, an underscore character (_), or a backslash (\). The remaining characters in the name can be letters, numbers, periods, and underscore characters.
- Names cannot be the same as a cell reference, such as Z$100 or R1C1.
- You can use multiple words in a name, but spaces are not allowed. Underscore characters and periods may be used as word separators — for example, Sales_Tax or First.Quarter.
- A name can contain up to 255 characters. If a name defined for a range contains more than 253 characters, you cannot select it from the Name box.
- Names can contain uppercase and lowercase letters. Microsoft Excel does not distinguish between uppercase and lowercase characters in names. For example, if you have created the name Sales and then create another name called SALES in the same workbook, the second name will replace the first one.

Name Manager – Use the Name Manager to create, edit, and delete range names. The Name Manager provides a complete list of range names in the workbook.

To Name a Range

1. Select the cell or range of cells. Click in the name box.
2. Type the name. Press Enter



Edit or Delete Named Ranges

Use the Name Manager to create, edit, and delete range names.

- From the Formulas Tab, in the Defined Names Group, click on Name Manager.
- Select the named range you want to modify.
- Make the necessary changes then close when finished.

Everyday Functions

The most used functions for all data analysis are IF and LOOKUP functions.

If Functions

The IF function is one of the most popular functions in Excel, and it allows you to make logical comparisons between a value and what you expect.

IF Function - Syntax and Usage

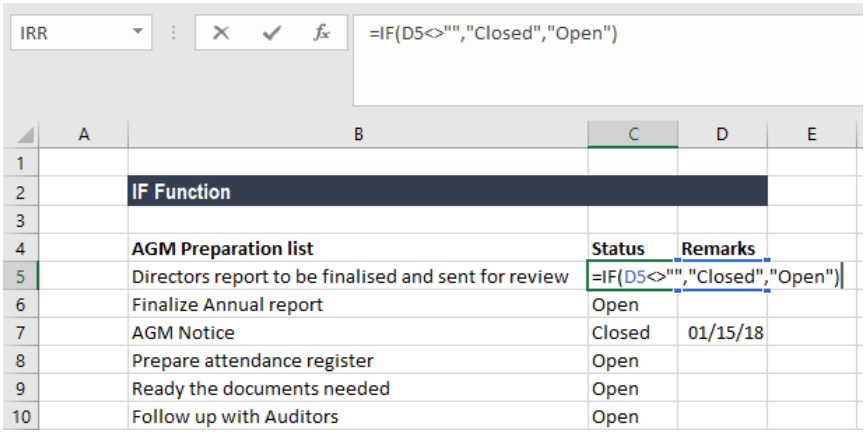
The IF function is one of Excel's logical functions that evaluates a certain condition and returns the value you specify if the condition is TRUE, and another value if the condition is FALSE.

The syntax for Excel IF is as follows: IF(logical_test, [value_if_true], [value_if_false])

As you see, the IF function has 3 arguments, but only the first one is obligatory, the other two are optional.

logical_test - a value or logical expression that can be either TRUE or FALSE. Required. In this argument, you can specify a text value, date, number, or any comparison operator. For example, your logical test can be expressed as or B1="sold", B1<12/1/2014, B1=10 or B1>10.

value_if_true - the value to return when the logical test evaluates to TRUE, i.e. if the condition is met. Optional. For example, the following formula will return the text "Good" if a value in cell B1 is greater than 10: =IF(B1>10, "Good")

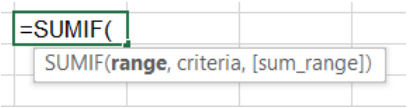


	A	B	C	D	E
1					
2		**IF Function**			
3					
4		**AGM Preparation list**	**Status**	**Remarks**	
5		Directors report to be finalised and sent for review	=IF(D5<>"","Closed","Open")		
6		Finalize Annual report	Open		
7		AGM Notice	Closed	01/15/18	
8		Prepare attendance register	Open		
9		Ready the documents needed	Open		
10		Follow up with Auditors	Open		

value_if_false - the value to be returned if the logical test evaluates to FALSE, i.e. if the condition is not met. Optional. So, an IF statement can have two results. The first result is if your comparison is True, the second if your comparison is False. For example, =IF(C2="Yes",1,2) says IF(C2 = Yes, then return a 1, otherwise return a 2).If you need to apply more than one criteria, **use** the **SUMIFS** function.

SumIF Function

The SUMIF function is a worksheet function that adds all numbers in a range of cells based on one criteria (for example, is equal to 2000). The SUMIF function is a built-in function in Excel that is categorized as a Math/Trig Function. As a worksheet function, the SUMIF function can be entered as part of a formula in a cell of a worksheet. To add numbers in a range based on multiple criteria, try the SUMIFS function.



Using the SUMIF function in financial modeling offers numerous benefits. Firstly, it allows users to isolate specific data points and calculate their cumulative values, enabling thorough analysis. This functionality is particularly useful when dealing with large datasets.

Secondly, SUMIF provides flexibility in handling conditional calculations. With its ability to sum values based on specific criteria, analysts can easily perform calculations for different scenarios and parameters. This versatility enhances the accuracy of financial models and enables users to make informed decisions based on various conditions.

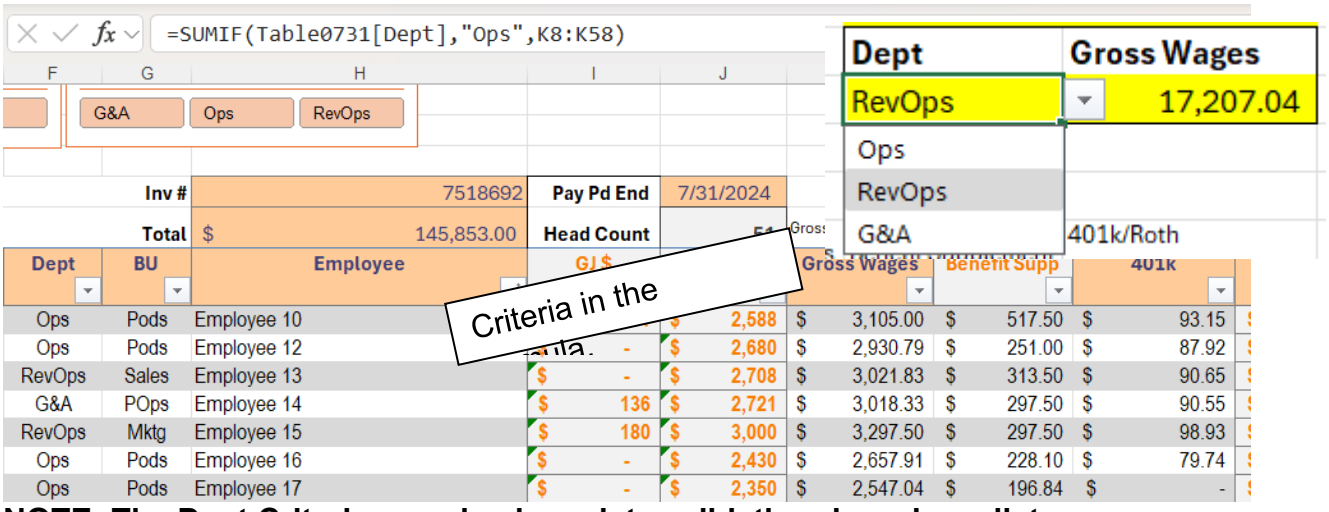
=SUMIF(range, criteria, [sum_range])

- The **range** parameter is actually the range of cells that will be evaluated by the 'criteria' parameter.
- The **criteria** parameter is the condition that must be met in the range parameter. For instance, if our range was a column that listed t-shirt color, a value like red or white could be our criteria. The criteria value can be text, a number, a date, a logical expression, a cell reference, or even another function.
- The **sum_range** parameter is optional as noted by the brackets. This simply means that if omitted, the sum_range will default to the same cells you chose for the 'range' parameter.

Examples of SUMIF

When using criteria in the SUMIF function, you can enter it manually in the formula or have it reference a cell.

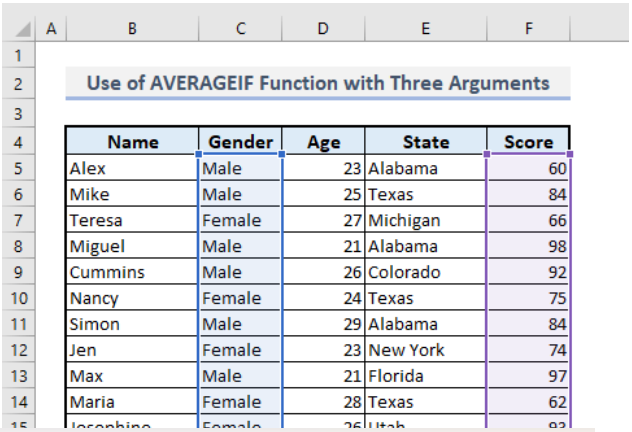
Benefits of referencing a cell is if the criteria will change on a regular basis, you can enter the criteria in a cell instead of having to update the formula each time.



NOTE: The Dept Criteria can also be a data validation drop down list.

COUNTIF Function

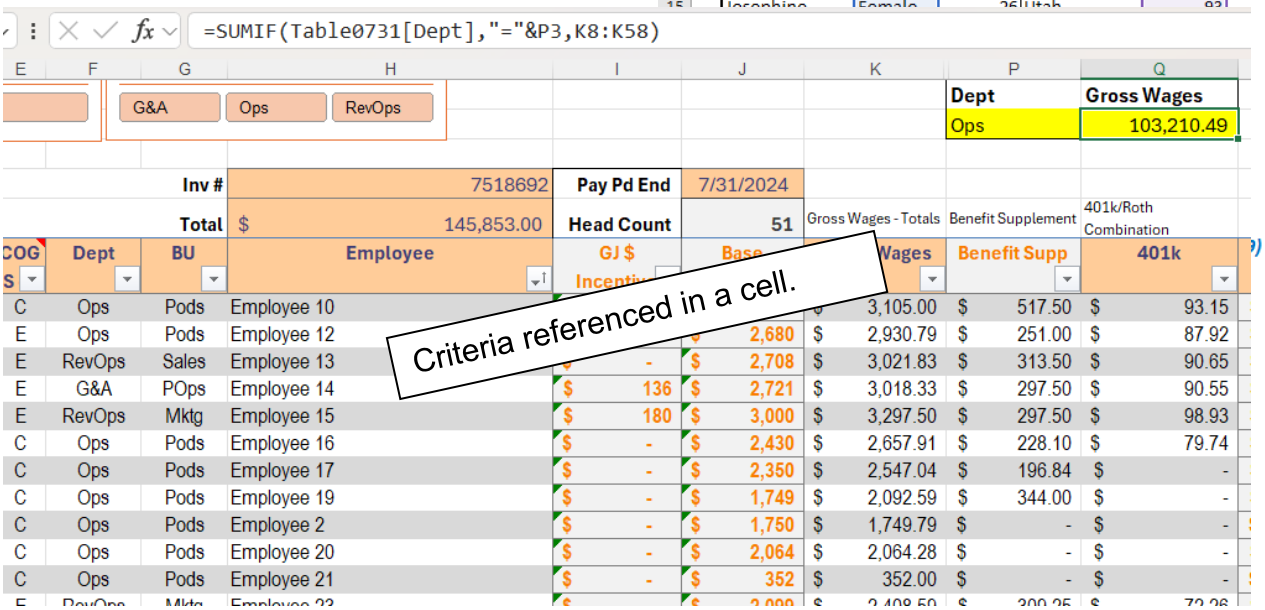
The Excel **COUNTIF** function in the Excel table determines the number of items, based on the criterion we provide. The function can be used, as an example, for determining the quantity of supplies, stocktaking, etc. The manual assumes that we have basic knowledge of creating formulas in Excel.



Use of AVERAGEIF Function with Three Arguments

Name	Gender	Age	State	Score
Alex	Male	23	Alabama	60
Mike	Male	25	Texas	84
Teresa	Female	27	Michigan	66
Miguel	Male	21	Alabama	98
Cummins	Male	26	Colorado	92
Nancy	Female	24	Texas	75
Simon	Male	29	Alabama	84
Jen	Female	23	New York	74
Max	Male	21	Florida	97
Maria	Female	28	Texas	62

Use COUNTIF, one of the statistical functions, to count the number of cells that meet a criterion; for example, to count the number of times a particular city appears in a customer list. =COUNTIF(Where do you want to look?, What do you want to look for?)



COGS	Dept	BU	Employee	GJ $ Incentive	Base	Wages	Benefit Supp	401k
C	Ops	Pods	Employee 10			$ 3,105.00	$ 517.50	$ 93.15
E	Ops	Pods	Employee 12		$ 2,680	$ 2,930.79	$ 251.00	$ 87.92
E	RevOps	Sales	Employee 13	$ -	$ 2,708	$ 3,021.83	$ 313.50	$ 90.65
E	G&A	POps	Employee 14	$ 136	$ 2,721	$ 3,018.33	$ 297.50	$ 90.55
E	RevOps	Mktg	Employee 15	$ 180	$ 3,000	$ 3,297.50	$ 297.50	$ 98.93
C	Ops	Pods	Employee 16	$ -	$ 2,430	$ 2,657.91	$ 228.10	$ 79.74
C	Ops	Pods	Employee 17	$ -	$ 2,350	$ 2,547.04	$ 196.84	$ -
C	Ops	Pods	Employee 19	$ -	$ 1,749	$ 2,092.59	$ 344.00	$ -
C	Ops	Pods	Employee 2	$ -	$ 1,750	$ 1,749.79	$ -	$ -
C	Ops	Pods	Employee 20	$ -	$ 2,064	$ 2,064.28	$ -	$ -
C	Ops	Pods	Employee 21	$ -	$ 352	$ 352.00	$ -	$ -

Syntax =COUNTIF(range, criteria)

AverageIF Function

AVERAGEIF calculates central tendency, which is the location of the center of a group of numbers in a statistical distribution. Returns the average (arithmetic mean) of all the cells in a range that meet a given criteria. Syntax =AVERAGEIF(range, criteria, [average_range])

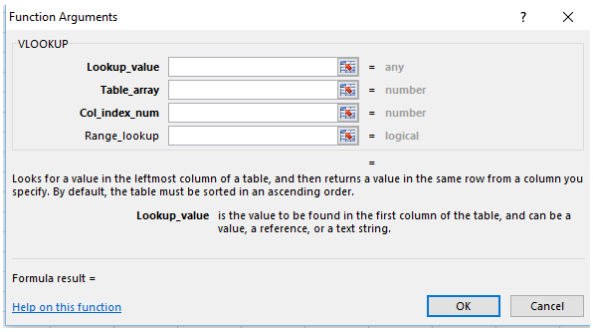
Lookup and Reference Functions

vLookup

The V in VLOOKUP stands for "Vertical." In Excel, the VLookup function searches for value in the left-most column of table_array and returns the value in the same row based on the index_number.

Usually lists like this have some sort of unique identifier for each item in the list. In this case, the unique identifier is in the “Item Code” column. Note: For the VLOOKUP function to work with a database/list, that list must have a column containing the unique identifier (or “key”, or “ID”), and that column must be the first column in the table. Our sample database above satisfies this criterion.

The secret to VLOOKUP is to organize your data so that the value you look up is to the left of the return value you want to find.



The VLOOKUP function syntax has the following arguments:
VLOOKUP (lookup_value, table_array, col_index_num, [range_lookup])

For example:

=VLOOKUP(105,A2:C7,2,TRUE)
=VLOOKUP("Fontana",B2:E7,2,FALSE)

lookup_value (required)

- The value you want to look up. The value you want to look up must be in the first column of the range of cells you specify in table-array.
- For example, if table-array spans cells B2:D7, then your lookup_value must be in column B. See the graphic below. Lookup_value can be a value or a reference to a cell.

table_array (required)

- The range of cells in which the VLOOKUP will search for the lookup_value and the return value.
- The first column in the cell range must contain the lookup_value (for example, Last Name in the picture below.) The cell range also needs to include the return value (for example, First Name in the graphic below) you want to find.

col_index_num (required)

- The column number (starting with 1 for the left-most column of table-array) that contains the return value.

range_lookup (optional)

- A logical value that specifies whether you want VLOOKUP to find an exact match or an approximate match:

- TRUE assumes the first column in the table is sorted either numerically or alphabetically, and will then search for the closest value. This is the default method if you don't specify one.
- FALSE searches for the exact value in the first column.

Best practices

Do this	Why
Use absolute references for range_lookup	Using absolute references allows you to fill-down a formula so that it always looks at the same exact lookup range.
Don't store number or date values as text.	When searching number or date values, be sure the data in the first column of table_array isn't stored as text values. Otherwise, VLOOKUP might return an incorrect or unexpected value.
Sort the first column	Sort the first column of the table_array before using VLOOKUP when range_lookup is TRUE.
Use wildcard characters	If range_lookup is FALSE and lookup_value is text, you can use the wildcard characters—the question mark (?) and asterisk (*)—in lookup_value. A question mark matches any single character. An asterisk matches any sequence of characters. If you want to find an actual question mark or asterisk, type a tilde (~) in front of the character.
Make sure your data doesn't contain erroneous characters.	When searching text values in the first column, make sure the data in the first column doesn't have leading spaces, trailing spaces, inconsistent use of straight (' or ") and curly (‘ or “) quotation marks, or nonprinting characters. In these cases, VLOOKUP might return an unexpected value. To get accurate results, try using the CLEAN function or the TRIM function to remove trailing spaces after table values in a cell.

XLookup

The XLOOKUP function searches a range or an array, and then returns the item corresponding to the first match it finds. If no match exists, then XLOOKUP can return the closest (approximate) match.

=XLOOKUP(lookup_value, lookup_array, return_array, [if_not_found], [match_mode], [search_mode])

Argument	Description
lookup_value Required*	The value to search for *If omitted, XLOOKUP returns blank cells it finds in lookup_array.
lookup_array Required	The array or range to search
return_array Required	The array or range to return
[if_not_found] Optional	Where a valid match is not found, return the [if_not_found] text you supply.

Argument	Description
	If a valid match is not found, and [if_not_found] is missing, #N/A is returned.
[match_mode] Optional	Specify the match type: 0 - Exact match. If none found, return #N/A. This is the default. -1 - Exact match. If none found, return the next smaller item. 1 - Exact match. If none found, return the next larger item. 2 - A wildcard match where *, ?, and ~ have special meaning.
[search_mode] Optional	Specify the search mode to use: 1 - Perform a search starting at the first item. This is the default. -1 - Perform a reverse search starting at the last item. 2 - Perform a binary search that relies on lookup_array being sorted in ascending order. If not sorted, invalid results will be returned. -2 - Perform a binary search that relies on lookup_array being sorted in descending order. If not sorted, invalid results will be returned.

XLOOKUP SYNTAX

We can also explore the full definition for the XLOOKUP function:

```
1  XLOOKUP(lookup_value, lookup_array, return_array, [match_mode], [search_mode])
```

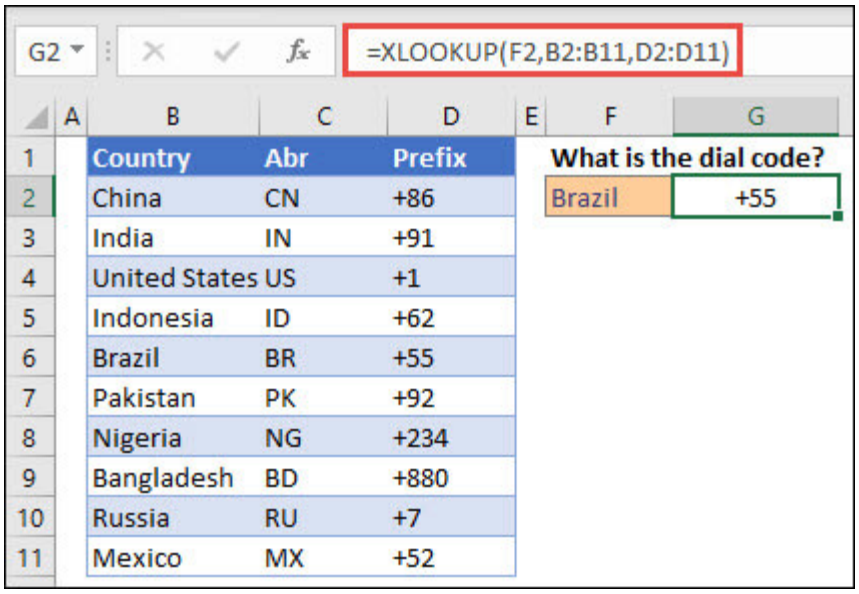
We already described the first 3 parameters however we also have 2 remaining:

match_mode – the type of match you want to make. What is interesting is the mode 2 allowing you to use ? and * wildcards to replace a single or any number of characters in a lookup operation

search_mode – type and direction of search. Useful when there is a particular sorting order of data.

Examples

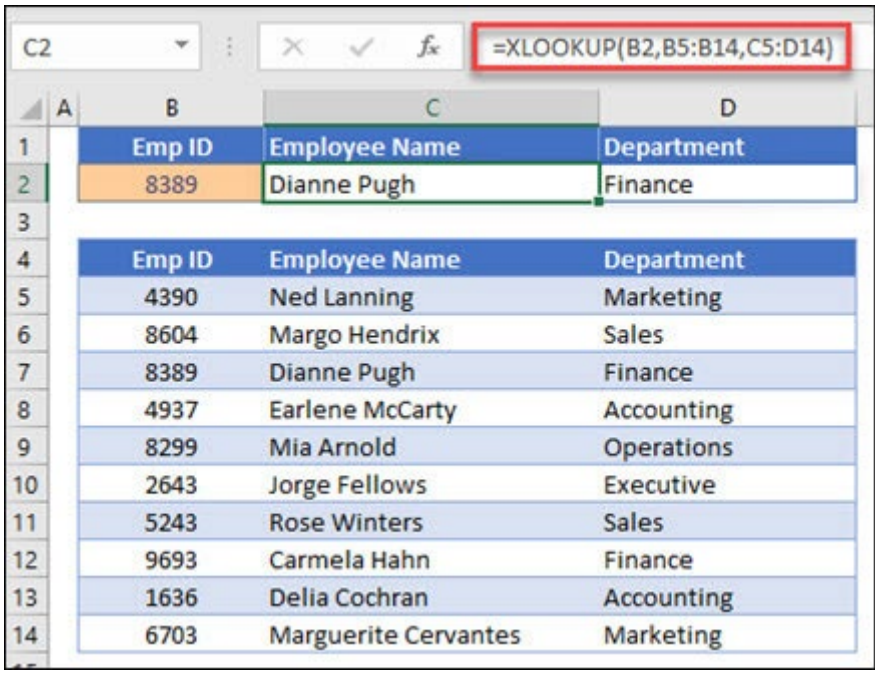
Example 1 uses XLOOKUP to look up a country name in a range, and then return its telephone country code. It includes the **lookup_value** (cell F2), **lookup_array** (range B2:B11), and **return_array** (range D2:D11) arguments. It doesn't include the **match_mode** argument, as XLOOKUP produces an exact match by default.



Country	Abr	Prefix
China	CN	+86
India	IN	+91
United States	US	+1
Indonesia	ID	+62
Brazil	BR	+55
Pakistan	PK	+92
Nigeria	NG	+234
Bangladesh	BD	+880
Russia	RU	+7
Mexico	MX	+52

Note: XLOOKUP uses a lookup array and a return array, whereas VLOOKUP uses a single table array followed by a column index number. The equivalent VLOOKUP formula in this case would be: =VLOOKUP(F2,B2:D11,3,FALSE)

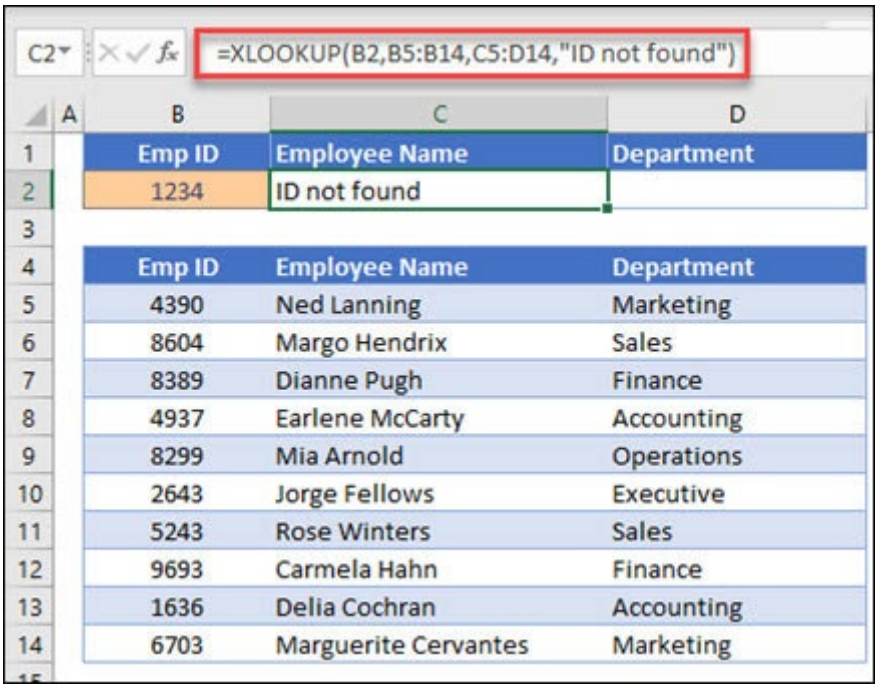
Example 2 looks up employee information based on an employee ID number. Unlike VLOOKUP, XLOOKUP can return an array with multiple items, so a single formula can return both employee name and department from cells C5:D14.



Emp ID	Employee Name	Department
8389	Dianne Pugh	Finance

Emp ID	Employee Name	Department
4390	Ned Lanning	Marketing
8604	Margo Hendrix	Sales
8389	Dianne Pugh	Finance
4937	Earlene McCarty	Accounting
8299	Mia Arnold	Operations
2643	Jorge Fellows	Executive
5243	Rose Winters	Sales
9693	Carmela Hahn	Finance
1636	Delia Cochran	Accounting
6703	Marguerite Cervantes	Marketing

Example 3 adds



	A	B	C	D
1		Emp ID	Employee Name	Department
2		1234	ID not found	
3				
4		Emp ID	Employee Name	Department
5		4390	Ned Lanning	Marketing
6		8604	Margo Hendrix	Sales
7		8389	Dianne Pugh	Finance
8		4937	Earlene McCarty	Accounting
9		8299	Mia Arnold	Operations
10		2643	Jorge Fellows	Executive
11		5243	Rose Winters	Sales
12		9693	Carmela Hahn	Finance
13		1636	Delia Cochran	Accounting
14		6703	Marguerite Cervantes	Marketing

an **if_not_found** argument to the preceding example.

Both formulas will return the same result. Notice, however, for XLOOKUP we provided both the lookup column and the result column separately. While for VLOOKUP we needed to provide the whole table and indicate the result column number. The additional difference we see is that in XLOOKUP we didn't have to provide the exact match parameter – in XLOOKUP the default is an exact match.

This makes the XLOOKUP function a combination of INDEX & MATCH functions. The VLOOKUP had a lot of issues like having to put the lookup column at the front of the table or at least before the result column.

Xlookup Advantages

Key differences you should spot in the example above and appreciate if you are used to using the VLOOKUP formula:

- XLOOKUP takes the lookup and result columns separately as arguments
- For XLOOKUP we don't need to specify the range_lookup parameter for exact matches i.e. True for exact match, False for approximation. This is because XLOOKUP assume exact matches by default
- The XLOOKUP formula is simply shorter
- Similarly to using the INDEX MATCH combo the XLOOKUP is safer as shifting columns will not break your formula

Date Functions

There are approximately 22 different DATE functions available in Excel. Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900.

The **TODAY** function is useful when you need to have the current date displayed on a worksheet, regardless of when you open the workbook. It is also useful for calculating intervals. For example, if you know that someone was born in 1963, you might use the following formula to find that person's age as of this year's birthday:
=YEAR(TODAY())-1963

This formula uses the **TODAY** function as an argument for the **YEAR** function to obtain the current year, and then subtracts 1963, returning the person's age.

Date Function Examples:

7/18/1985	18	=DAY(A1)
	7	=MONTH(A1)
	1985	=YEAR(A1)
12/25/2012	3	=WEEKDAY(A4)
1/10/2012	2	=WEEKNUM(A5)
Workday Function		
Completion Date	1/2/2013	=WORKDAY(B11,B12,B13:B15)
Start Date	7/1/2012	
Total days needed	130	
Holidays	7/4/2012	
	11/22/2012	
	12/25/2012	

DATE Example:

	A	B	C	D	E	F
1	**Date**	**Years to add (or subtract)**				
2	6/9/2009	3				
3	9/2/2009	-5				
4	12/10/2010	25				
5	**Formula**	**Description (Result)**				
6	6/9/2012	Adds 3 years to 6/9/2009 (6/9/2012)	=DATE(YEAR(A2)+B2,MONTH(A2),DAY(A2))			
7	9/2/2004	Subtracts 5 years from 9/2/2009 (9/2/2004)	=DATE(YEAR(A3)+B3,MONTH(A3),DAY(A3))			
8	12/10/2035	Adds 25 years to 12/10/2010 (12/10/2035)	=DATE(YEAR(A4)+B4,MONTH(A4),DAY(A4))			

TODAY Function

The **TODAY** function is useful when you need to have the current date displayed on a worksheet, regardless of when you open the workbook. It is also useful for calculating intervals. =TODAY()

Example, if you know that someone was born in 1963, you might use the following formula to find that person's age as of this year's birthday: =YEAR(TODAY())-1963

This formula uses the **TODAY** function as an argument for the **YEAR** function to obtain the current year, and then subtracts 1963, returning the person's age.

- To figure out the number of years between 2 dates: =YEAR(date)-YEAR(date)
- If you want the difference between a date and “today’s date”: =TODAY()-(date)

NETWORKDAYS

Find the difference between a start and end date but only count the dates Monday thru Friday, no weekends. You can also add holidays.

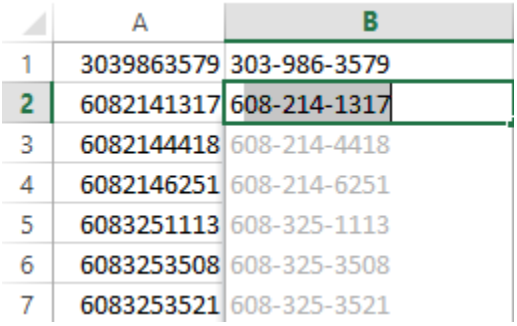
NETWORKDAYS syntax: =NETWORKDAYS(start_date, end_date, [holidays])

Flash Fill

Flash Fill is like a data assistant that finishes your work for you. As soon as it detects what you want to do, Flash Fill enters the rest of your data in one fell swoop, following the pattern it recognizes in your data.

Here's an example:

1. You have a long list containing huge amounts of data. For example, let's says it's the names of your customers and their seven-digit phone numbers shown in the Home Number column. If you need to make a couple of new columns out of this data, you can use Flash Fill. If you need to change the format of each phone number to 395-6492 instead of 3956492, inserting a hyphen in every phone number by typing is a lot of work. In previous versions of Excel, you could use a formula for that. However, Excel 2013 offers an even quicker way of doing it by using Flash Fill.



	A	B
1	3039863579	303-986-3579
2	6082141317	608-214-1317
3	6082144418	608-214-4418
4	6082146251	608-214-6251
5	6083251113	608-325-1113
6	6083253508	608-325-3508
7	6083253521	608-325-3521

Type the right format of the first phone number in a new column (e.g. 395-6492). Go to the next cell of the column and start typing the next phone number. After typing the first three digits (722).

Excel will fill in the format you need for the rest of the phone numbers. All you need to do is just press enter, and you will get all phone numbers with a hyphen in that column.

Sorting and Filtering Data

Sorting Data

Sorting data in Excel allows you to arrange your data in a specific order. You can sort data alphabetically, numerically, or by date, either in ascending or descending order. For example, you might sort a list of names from A to Z or a list of sales figures from highest to lowest. This helps in organizing and analyzing your data more effectively.

Filtering Data

Filtering data in Excel enables you to display only the rows that meet certain criteria while hiding the others. This is useful when you want to focus on specific information within a large dataset. For instance, you can filter a list of products to show only those that are in stock or filter sales data to display only transactions from a particular region.

Custom Sort

1. Select a range of cells with two or more columns of data, or make sure that the active cell is in a table with two or more columns.
2. On the Home tab, in the Editing group, click Sort & Filter, and then click Custom Sort.
3. The Sort dialog box is displayed.
4. Under Column, in the Sort by box, select the first column that you want to sort.
5. Under Sort On, select the type of sort. Do one of the following:
   - To sort by text, number, or date and time, select Values.
   - To sort by format, select Cell Color, Font Color, or Cell Icon.
6. Under Order, select how you want to sort. Do one of the following:
   - For text values, select A to Z or Z to A.
   - For number values, select Smallest to Largest or Largest to Smallest.
   - For date or time values, select Oldest to Newest or Newest to Oldest.
   - To sort based on a custom list, select Custom List.
   - To add another column to sort by, click Add Level, and then repeat steps three through five.
7. To copy a column to sort by, select the entry, and then click Copy Level.
8. To delete a column to sort by, select the entry, and then click Delete Level.

To change the order in which the columns are sorted, select an entry, and then click the Up or Down arrow to change the order. Entries higher in the list are sorted before entries lower in the list.

Filtering

If your worksheet contains a lot of content, it can be difficult to find information quickly. Filters can be used to narrow down the data in your worksheet, allowing you to view only the information you need.

Do one of the following:

1. Select a range of cells containing alphanumeric data.
2. On the Home tab, in the Editing group, click Sort & Filter, and then click Filter.

The list of text values can be up to 10,000. If the list is large, clear (Select All) at the top, and then select the specific text values to filter by.

Use the down arrow to the right of each column heading to display a unique list of items found in the column. If you only want to see specific records (rows) of information you can unselect all items and select only the items you want to display.

When a filter is applied to a column you will see the down arrow with a filter icon for that column.

To remove a filter from a column, click on the down arrow for that column then click on.

Subtotal Function

The Subtotal function returns a subtotal in a list or database. It is generally easier to create a list with subtotals by using the Subtotal command in the Outline group on the Data tab in the Excel desktop application. Once the subtotal list is created, you can modify it by editing the SUBTOTAL function.

Syntax

Function_num (includes hidden values)	Function_num (ignores hidden values)	Function
1	101	AVERAGE
2	102	COUNT
3	103	COUNTA
4	104	MAX
5	105	MIN
6	106	PRODUCT
7	107	STDEV
8	108	STDEVP
9	109	SUM
10	110	VAR
11	111	VARP

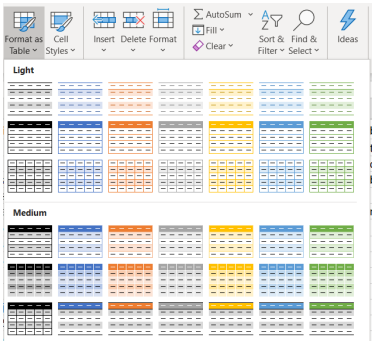
=SUBTOTAL(function_num,ref1,[ref2],...)

The SUBTOTAL function syntax has the following arguments:

Function_num Required. The number 1-11 or 101-111 that specifies the function to use for the subtotal. 1-11 includes manually-hidden rows, while 101-111 excludes them; filtered-out cells are always excluded.

Using Excel Tables

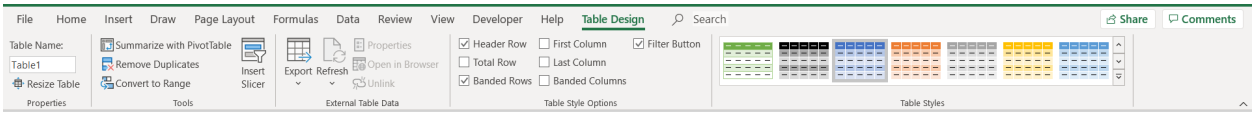
To make managing and analyzing a group of related data easier, you can turn a range of cells into a Microsoft Excel table (previously known as an Excel list). A table typically contains related data in a series of worksheet rows and columns that have been formatted as a table. By using the table features, you can then manage the data in the table rows and columns independently from the data in other rows and columns on the worksheet.



Note: Excel tables should not be confused with the data tables (data table: A range of cells that shows the results of substituting different values in one or more formulas. There are two types of data tables: one-input tables and two-input tables.) that are part of a suite of what-if analysis commands.

To Apply a Table:

1. Click inside the data range.
2. From the Home Tab in the Styles Group click on Format as Table.
3. Click on one of the preformatted options.
4. Use the Table Tools to make changes to the Table.



Sorting and filtering

Filter drop-down lists (drop-down list box: A control on a menu, toolbar, or dialog box that displays a list of options when you click the small arrow next to the list box.) are automatically added in the header row of a table.

Formatting table data

You can quickly format table data by applying a predefined or custom table style. You can also choose Table Styles options to display a table with or without a header or a totals row, to apply row or column banding to make a table easier to read, or to distinguish between the first or last columns and other columns in the table.

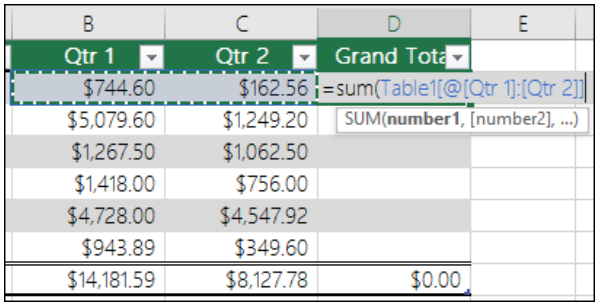
Formulas Using Table Data

Calculated columns in Excel tables are a fantastic tool for entering formulas efficiently. They allow you to enter a single formula in one cell, and then that formula will automatically expand to the rest of the column by itself. There's no need to use the Fill or Copy commands. This can be incredibly time saving, especially if you have a lot of rows. And the same thing happens when you change a formula; the change will also expand to the rest of the calculated column.

Note: The screen shots in this article were taken in Excel 2016. If you have a different version your view might be slightly different, but unless otherwise noted, the functionality is the same.

Create a calculated column

1. Insert a new column into the table. You can do this by typing in the column immediately to the right of the table, and Excel will automatically extend the table for you. In this example, we created a new column by typing "Grand Total" into cell D1.
2. Type the formula that you want to use, and press **Enter**.



In this case we entered **=sum(**, then selected the **Qtr 1** and **Qtr 2** columns. As a result, Excel built the formula: **=SUM(Table1[@[Qtr 1]:[Qtr 2]])**. This is called a **structured reference** formula, which is unique to Excel tables. The structured reference format allows the table to use the same formula for each row. A regular Excel formula for this would be **=SUM(B2:C2)**, which you would then need to copy or fill down to the rest of the cells in your column

3. When you press Enter, the formula is automatically filled into all cells of the column — above as well as below the cell where you entered the formula. The formula is the same for each row, but since it's a structured reference, Excel knows internally which row is which.

Remove a Table

If you choose to remove the Table features from a range of data you can do so by:

1. Select the table.
2. From the Design tab in the Tools Group, click on Convert to Range .

Excel Charts

To create a professional-looking chart that displays the details that you want, you can modify the chart, apply predefined styles and layouts, and add eye-catching formatting. You can also reuse a favorite chart by saving it as a chart template.

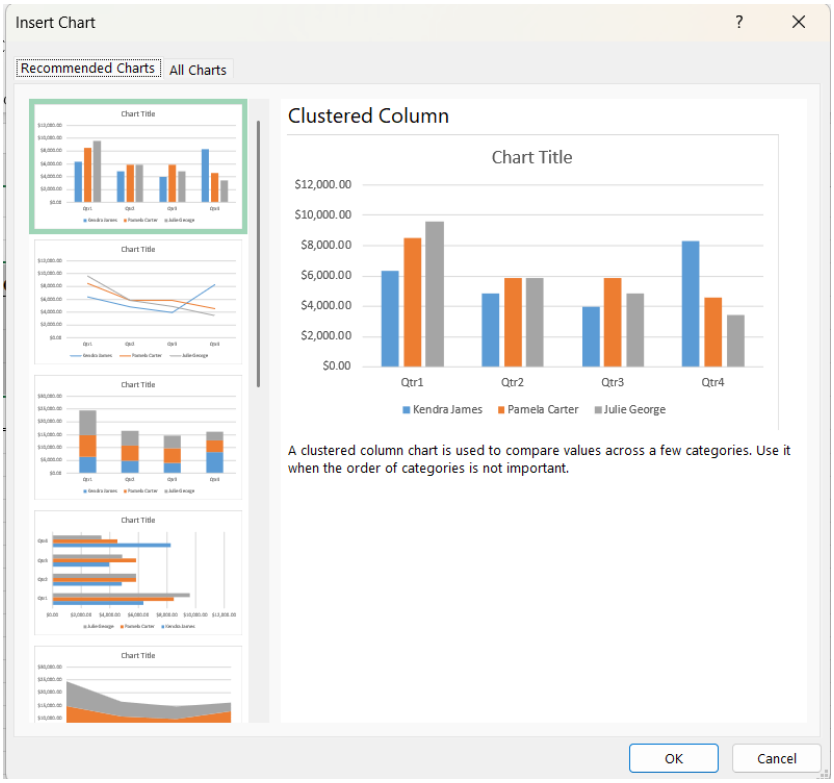
To create a Chart:

1. Select your data.
2. Go to the Insert Tab and choose one of the Chart Types in the Chart Group.
3. Once your chart has been created you now can use contextual tools for formatting the chart.

NOTE: F11 is the keyboard shortcut to creating a chart.

Recommended Charts

With Chart recommendations, Excel recommends the most suitable charts for your data. Get a quick peek to see how your data looks in the different charts, and then simply pick the one that shows the insights you want to present.



The **Recommended Charts** button on the **Insert** tab lets you pick from a variety of charts that are right for your data. Related types of charts like scatter and bubble charts are under one umbrella. And there's a brand-new button for combo charts—a favorite chart you've asked for. When you click a chart, you'll

also see a simpler Chart Tools ribbon. With just a **Design** and **Format** tab, it should be easier to find what you need.

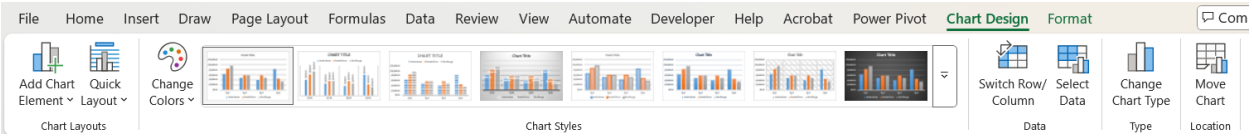
Add Chart Elements

Three chart buttons let you quickly pick and preview changes to chart elements (like titles or labels), the look and style of your chart, or to the data that is shown.

You can include rich and refreshable text from data points or any other text in your data labels, enhance them with formatting and additional freeform text, and display them in just about any shape. Data labels stay in place, even when you switch to a different type of chart. You can also connect them to their data points with leader lines on all charts, not just pie charts.

Chart Tools

From the Ribbon when you are selected on a Chart you will have Chart Tools available. There are 2 tabs for the Chart Tools – Design and Format.



On the Design Tab you will find the following Groups:

Chart layouts group

- Add chart element
- Quick layout

Chart styles group

- Change colors
- Chart styles

Data group

- Switch row/column
- Select data

Type group

- Change chart type

Location group

- Move chart