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Excel functions guide

The Excel DATE function combines three values to create a date. When you specify the year, month, and day, Excel produces a serial number that can then be formatted as a normal looking date. The typical way to enter a date in Excel is to write the entire date within one cell, but that's inconvenient when you're dealing with lots of information. The DATE function can be useful if the date isn't formatted correctly, like if it's combined with regular text or is spread over multiple cells. The DATE function is fairly easy to understand and remember. Below is more information on how to use it in your formulas. The DATE function can be used in every version of Excel. This is how every instance of the date function has to be written for Excel to process it correctly: =DATE(year,month,day) Year: Enter the year as a number that's one to four digits in length or enter the cell reference to the location of the data in the worksheet. The year argument is required. Month: Enter the month of the year as a positive or negative integer from 1 to 12 (January to December) or enter the cell reference to the location of the data. The month argument is required. Day: Enter the day of the month as a positive or negative integer from 1 to 31 or enter the cell reference to the location of the data. The day argument is required. Here are some other important things to know about the year, month, and day arguments: By default, Excel uses the 1900 date system, which means that the DATE function won't display the year correctly for anything older than 1900. Entering 0 as the year value is the same as entering 1900, 1 is equal to 1901, 105 is 2005, etc. Exceeding 12 as the month value will add that number of months to the year value. 13, then, adds one year and one month to the date. Using a negative number as the month value will subtract that number of months, plus one, from the first month of year. If the day value exceeds the number of days that month has, the excess days are added to the first day of the next month. A negative day value subtracts that number of days, plus one, from the first day of month. Below are a number of real-world formulas that use the DATE function: =DATE(A2,B2,C2) This example of the DATE function is using A2 for the year, B2 for the month, and C2 for the day. =DATE(2020,A2,B2) You can also mix how the data is obtained. In this example, we're making 2020 the year argument, but month and day is being pulled from other cells. =DATE(2020,-2,15) Here, we're using a negative number in the month space. This moves backwards through the year instead of forward, beginning on January 2020 (since the formula includes 2020). This DATE formula produces 10/15/2019. =DATE(2020,1,-5) Without the negative number, this date would be calculated as 1/5/2020. However, the negative day value is subtracting five days (plus one) from 1/1/2020, which produces the date 12/26/2019. =DATE(2020,19,50) This example combines a few of the rules mentioned above. The year value will increase from 2020 because month exceeds 12, and the month that will be calculated will change as well since the day value exceeds the number of days in any month. This DATE formula produces 8/19/2021. =DATE(YEAR(A2)+10,MONTH(A2),DAY(A2)) The Excel DATE function can also be used with other dates, like to add time to an existing date. In this example, we're wanting to see the date that's 10 years past an existing date. The existing date is in cell E2, so we need to write this formula in a way that extracts the year, month, and day from E2 but also adds 10 to the year value. =A2-DATE(YEAR(A2),1,0) Here's a similar example of the DATE function where we're calculating how many days into the year the date in cell E10 is. For example, 1/1/2020 is one day into the year, the 5th of January is five days, and so on. In this example, E10 is 8/4/2018, so the result is 216. =DATE(LEFT(A2,4),MID(A2,5,2),RIGHT(A2,2)) If the cell you're dealing with contains the full date but it's formatted as text, such as 20200417, you can use this DATE formula, combined with the LEFT, MID, and RIGHT functions, to convert the cell to a properly formatted date. What this is doing is extracting the first four digits from the left with LEFT(A2,4), taking two digits from the middle at the fifth character via MID(A2,5,2), and combining it with the last two digits from the right with RIGHT(A2,2). The calculated date is 4/17/2020. See our articles on using Excel's LEFT, RIGHT, and MID functions for more information. =DATE(YEAR(TODAY()), MONTH(TODAY()), 5) The TODAY function can be used with the DATE function to pull information about today. For example, to remind yourself to pay bills every month on the 5th, you can use this DATE formula to automatically add in the current year and month, but then place 5 (or a cell reference) as the day value. =DATE(A2,MONTH(1&B2),C2) Sometimes a date includes the text version of the month, like June. Since Excel doesn't understand this as a number, you have to convert it to one with the MONTH function. We've embedded this directly in the DATE formula, in the month position, as MONTH(1&B2). If the result of the DATE function shows a bunch of numbers instead of a date, you'll need to format the cell as a date. For example, you might see a large number like 43938 instead of a normal looking date, as in this screenshot below: To reformat the cell, select it, choose the drop-down menu from the Number group item, and then pick one of the date formats. Thanks for letting us know! Tell us why! Analyzing a broad set of numbers takes time, but Microsoft Excel makes it easier. The Excel SMALL function and LARGE function can help you target specific numbers and values in a data set. Here's how to use these functions. Instructions in this article apply to Excel for Microsoft 365, Excel 2019, Excel 2016, Excel 2013, and Excel 2010. The SMALL function in Excel returns k-th smallest value (where k- represents the position of the value, for example, first, second, or fifth) in a data set that you determine. You might want to know the first, third, or fifth smallest value. The purpose of this function is to return values with a particular relative standing in a data set. The SMALL function is written as SMALL(array, k) where array is the range of data you want to examine, and k is the user-defined point (for example, first, second, or fourteenth) that the function is searching for among that array of data. This data can run across a single column or row, or it can be spread across multiple rows and columns. You'll define this array in the SMALL function syntax. If n is the number of data points in an array, SMALL(array,1) equals the smallest value, and SMALL(array,n) equals the largest value. Select a cell in the spreadsheet to enter the SMALL function. The example used in this tutorial searches for the third smallest number in the data set, so k = 3. Enter =SMALL to begin the formula. Select the array of data. Excel allows you to highlight the data set. When the correct values are selected, Excel names the array (in this case, it's B2:D9). After you select the data array, enter a comma (,) to continue the formula. Enter the k value. This example uses 3. Type 3, then close the parentheses of the function. The formula should read: =SMALL(B2:D9,3) Functions and formulas in Excel must start with the equal sign (=) before typing the function and parameters. Press Enter to calculate the function result. This returns the value 4, which means that out of this array of data, 4 is the third smallest value. Conversely, the LARGE function in Excel returns the k-th largest value (where k- represents the position of the value, for example, first largest or fifth largest) that you determine in a data set. The LARGE function is written as LARGE(array, k) where array is the range of data you want to examine, and k is the user-defined point (for example, first, second, or fourteenth) the function is searching for among the data array. Choose an array of data. This data can run across a single column or row, or it can be spread across multiple rows and columns. You'll need to define this array in the LARGE function syntax. If n is the number of data points in the array, LARGE(array,1) equals the largest value, and LARGE(array,n) equals the largest value. Select a cell in the spreadsheet to type the LARGE function. In example searches for the largest number in the data set, so k = 1. Begin the formula by typing =LARGE(Select the array of data. Excel allows you to highlight the data set. When the correct values are selected, Excel names the array (in this case, it's B2:D9). Type a comma (,) to continue the formula. Enter the k value. This example uses 1. Type 1, then close the parentheses of the function. The formula should read: =LARGE(B2:D9,1) Press the Enter key to calculate the function result. This example searched for the largest number in the array, which is 5111. If an array is large, you may need to know how many data points are in the set. Highlight the array then look at the bottom of the Excel screen. Count:XX indicates the number of values in the array, where XX is the number. Excel formulas have to be exactly right to work. If you encounter an error, here are some things to watch for: If the array is empty, meaning you didn't select cells that contain data, SMALL and LARGE functions return the #NUM! error. If k ≤ 0 or if k exceeds the number of data points within an array, SMALL and LARGE return the #NUM! error. Thanks for letting us know! Tell us why! The ROUND function in Excel creates a formula that rounds any value to a specific number of digits. Here's how to use the ROUND function in Excel to round numbers to the left or right of a decimal point, to the nearest whole number, and to the nearest 10 or 100. Instructions in this article apply to Excel for Microsoft 365, Excel 2019, and Excel 2016. Use the ROUND function to round numbers up or down. Rounding numbers is not the same as changing the number format or changing the number of decimal places displayed in a worksheet. These only change how the number appears in the worksheet. When you round a number, you change how the number appears and how Excel stores the number. Excel stores the number as the new rounded number; the original value is removed. The syntax of the ROUND function is: ROUND(number,num_digits) The number argument specifies the number that is to be rounded. The number argument can be a specified value (for example, 1234.4321) or a cell reference (such as A2). The num_digits argument is the number of digits to which the number argument will be rounded. The num_digits argument can be a specified value or a cell reference to a cell that contains the num_digits value. A 0 (zero) num_digits argument rounds a whole number to the nearest integer and rounds a decimal value to a whole number. For example, the function =ROUND(1234.4321,0) rounds the number to 1234. A positive num_digits argument (the argument is greater than 0) rounds the number to the specified number of decimal places. A positive num_digits argument rounds the number to the right of the decimal point. For example, the function =ROUND(1234.4321,2) rounds the number to 1234.43. A negative num_digits argument (the argument is less than 0) rounds the number to the left of the decimal point. For example, the function =ROUND(1234.4321,-2) rounds the number to 1200. When Excel uses the ROUND function to round numbers, it follows conventional rounding rules. For values that are less than 5, Excel rounds down to the nearest number. For values that are 5 or higher, Excel rounds up to the nearest number. Here are some examples of how the ROUND function is used in Excel: When you want to see the effect rounding has on a number, enter that value as the number argument in the ROUND function. To display the results of a rounded number: Select a cell in the worksheet that will contain the result of the formula. In the formula bar, enter =ROUND. As you type, Excel suggests possible functions. Double-click ROUND. Enter the number you want to round, followed by a comma (,). Enter the number of digits to which you want to round the value. Enter a closing parenthesis and press Enter. The rounded number appears in the selected cell. When you have a worksheet full of data, and you want to round columns of numbers, apply the ROUND function to one cell, then copy the formula to the other cells. To use the Function Arguments dialog box to enter the ROUND function: Enter the data you want to round. Select the first cell that will contain the result of the formula. Select Formulas > Math & Trig > Round. Place the cursor in the Number text box, then go to the worksheet and select the first cell in the column of numbers you want to round. Place the cursor in the Num_digits text box and enter the number that corresponds to how you want to round the number. Select OK. Select the cell that contains the formula. Drag the fill handle to the bottom of the column of values. The ROUND function is copied to the cells, and the rounded numbers for each value appear. Thanks for letting us know! Tell us why! Excel is great for storing information, but it can be hard to find what you're looking for when datasets get particularly large. The CHOOSE function is a fantastic workaround to that problem, helping you find the information you need quickly and easily. Here's how to use the CHOOSE function in Excel. The instructions in this article apply to Excel 365, Excel 2019, Excel 2016, and Excel online. The CHOOSE function outputs a value from a list when you give it a specific position or index to draw from. If you created a numbered list, for example, and gave it a number to draw from, then it will return the corresponding value at that numbered point on the list. In practical terms, this can be useful to find the name of something using an identifying number, like a person on an electoral register, or a product from a catalog. The CHOOSE function is a relatively simple one to use in Excel, though it can take a little longer to set up, depending on the size of your dataset. In our set example for how to use the CHOOSE function, we're keeping things simple with a limited dataset of eight products in a stationary catalog. We want to find out what a product is using its single digit product number. Your dataset may vary, but you can follow along and create a comparable dataset to practice with. Open your Excel document or create a new one and import your chosen data set. Make sure the list of items is numbered in a similar manner to our example. Select a cell where you want your CHOOSE output to appear. You'll then type in the CHOOSE function, which, when complete, will be written in the following format: =CHOOSE (index_num), value1, value2, [...]) Type =CHOOSE and double-click the CHOOSE function that appears. Alternatively, use the function menu to select CHOOSE and input your numbers and values that way. Select the cell where you want the CHOOSE input to come from. In our case, that's the cell under the second Number heading, F6. Type a comma, then select the first value for your list. In our case, that's Pencil, cell C6. Type another comma, then select the second value for your list. Continue doing this until you have selected all values and end your function with a closed bracket. Our eventual function reads like: =CHOOSE(F6,C6,C7,C8,C9,C10,C11,C12,C13) Don't fret that the CHOOSE cell now displays a #VALUE! error. That's simply because it doesn't have a number to draw from. To make full use of your CHOOSE function, type a number that corresponds to your values in the index number field we specified in the CHOOSE function. It should then change that error into the corresponding value. In our case, typing 1 outputs Pencil. Typing 5 outputs Pens, and so on. This is a very basic example of how to use the CHOOSE function, but you can specify ranges instead of individual cells for values, if you so choose. That means you can have multiple outputs for each index number, letting you find a lot of information very quickly. It can even be combined with SUM and other functions for additional functionality. Thanks for letting us know! Tell us why!