

Alan's Favourite Tips – Part II

Excel Tip #1 - A quick way to delete blank rows in Excel

Deleting blank rows in an Excel data range is easy with this technique but watch out for unintended consequences.

Blank rows aren't bad, but in most sheets, they're definitely undesirable. Excel uses blanks to determine data ranges, and a blank row in the wrong place will inhibit many built-in features. Fortunately, there's an easy way to remove blank rows from a data range, but this easy technique has the potential to destroy data, so you must be careful.

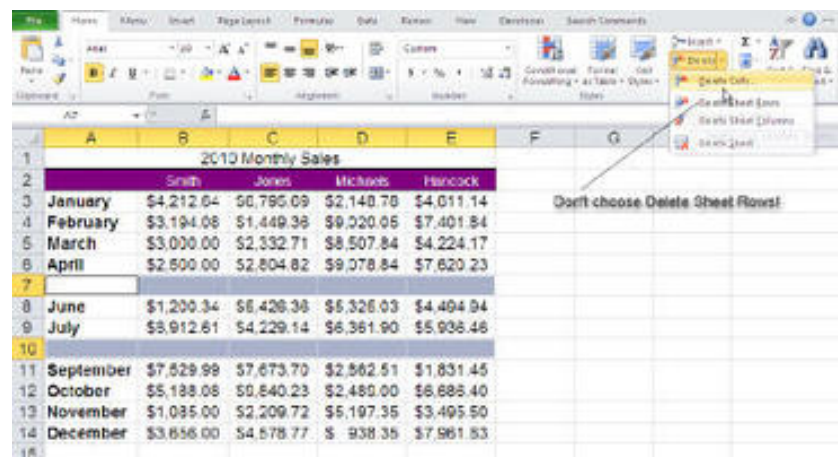
	A	B	C	D	E	F	G
1	2010 Monthly Sales						
2		Smith	Jones	Michaels	Hancock		
3	January	\$4,212.64	\$6,795.69	\$2,148.78	\$4,611.14		
4	February	\$3,194.08	\$1,449.36	\$9,020.05	\$7,401.84		
5	March	\$3,000.00	\$2,332.71	\$8,507.84	\$4,224.17		
6	April	\$2,500.00	\$2,804.82	\$9,078.84	\$7,620.23		
7							
8	June	\$1,200.34	\$5,426.36	\$5,325.03	\$4,494.94		
9	July	\$6,912.61	\$4,229.14	\$6,361.90	\$5,936.46		
10							
11	September	\$7,529.99	\$7,673.70	\$2,862.51	\$1,831.45		
12	October	\$5,188.08	\$9,840.23	\$2,489.00	\$6,686.40		
13	November	\$1,085.00	\$2,209.72	\$5,197.35	\$3,495.50		
14	December	\$3,656.00	\$4,578.77	\$ 938.35	\$7,961.63		
15							

After selecting the data range in Excel, continue as follows:

1. Press [F5].
2. In the resulting Go To dialog box, click Special.
3. Click the Blanks option and click OK. Doing so selects the blank cells (what you might think of as rows) in the selected range. In this case, that's A7:E7 and A10:E10.
4. Now you're ready to delete the selected cells. On the Home tab, click the Delete dropdown in the Cells group and choose Delete Cells. Excel will display the Delete dialog box, with the Delete Cells Up option selected. Click OK. Or, press [Ctrl]+-.

1. Excel will delete the blank cells from the selected data range.

	A	B	C	D	E	F	G
1	2010 Monthly Sales						
2		Smith	Jones	Michaels	Hancock		
3	January	\$4,212.64	\$6,795.69	\$2,148.78	\$4,611.14		
4	February	\$3,194.08	\$1,449.36	\$9,020.05	\$7,401.84		
5	March	\$3,000.00	\$2,332.71	\$8,507.84	\$4,224.17		
6	April	\$2,500.00	\$2,804.82	\$9,078.84	\$7,620.23		
7							
8	June	\$1,200.34	\$5,426.36	\$5,325.03	\$4,494.94		
9	July	\$8,912.61	\$4,229.14	\$6,361.90	\$5,936.46		
10							
11	September	\$7,529.99	\$7,673.70	\$2,862.51	\$1,831.45		
12	October	\$5,188.08	\$9,840.23	\$2,489.00	\$6,686.40		
13	November	\$1,085.00	\$2,209.72	\$5,197.35	\$3,495.50		
14	December	\$3,656.00	\$4,578.77	\$ 938.35	\$7,961.63		
15							
16							



	A	B	C	D	E	F
1	2010 Monthly Sales					
2		Smith	Jones	Michaels	Hancock	
3	January	\$4,212.64	\$6,795.69	\$2,148.78	\$4,611.14	
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7	June	\$1,200.34	\$5,426.36	\$5,325.03	\$4,494.94	
8	July	\$6,912.61	\$4,229.14	\$6,361.90	\$5,936.46	
9	September	\$7,529.99	\$7,673.70	\$2,862.51	\$1,831.45	
10	October	\$5,188.08	\$9,840.23	\$2,489.00	\$6,686.40	
11	November	\$1,085.00	\$2,209.72	\$5,197.35	\$3,495.50	
12	December	\$3,656.00	\$4,578.77	\$ 938.35	\$7,981.63	
13						

Choosing Delete Cells deletes only the blank cells in the previously selected range. If you choose Delete Sheet Rows in step 4, you could potentially destroy data (often unseen) to the right. Choose carefully when using this option to delete blank rows when you really want to delete just the blank cells. It's easy to think in terms of rows and choose the wrong option!

Excel Tip #2 - Use a custom format in Microsoft Excel to reduce the number of digits in a large number without losing its scale.

Large numbers are a bit laborious to read, especially if there are many of them. To improve readability, you might want to reduce the number of digits, without losing the number's scale. For example, the sheet below shows a number of large numbers, some in the millions. We can reduce the number of digits using a custom format, but be careful; you might get some unexpected results! (We're specifically working with millions, but you can apply this technique to any scale.)

Now, let's try a custom format and see what happens:

1. Select the data range and press [Ctrl]+1 to display the Format Cells dialog.
2. From the Category list, choose Custom.
3. In the Type control, enter the "\$#, " M"; format string. The pound sign combined with the two comma characters displays a character in the millions position, if one exists. The " M" component displays a literal M character, to denote millions.
4. Click OK.

The results look good, but a couple of values disappeared! That's because those numbers are less than one million. You could add a few pound signs, but you might not get what you expect. For instance, repeat the instructions above and use the format string "\$#,###, " M";. (The period after the semi-colon is grammatical and not part of the format string.) As you can see below, the results aren't accurate. You don't want to imply that \$21 thousand is actual \$21 million, but that's what this custom format does! In addition, someone might interpret \$1,794 M as \$1,794 millions.

We have two formatting problems. How can we express millions and less than one million using the same custom format? Let's try one more time using the format string \$#.##,," M";--the character to the right of the pound sign is a period character, not a comma. This format retains the scale, without losing any values and without misrepresenting the values!

The two comma characters retain the millions scale. The period character forces the value to truncate, while the last two-pound signs display the appropriately rounded digits.

Excel Tip #3 - Screen Clipping

Insert a screenshot or screen clipping

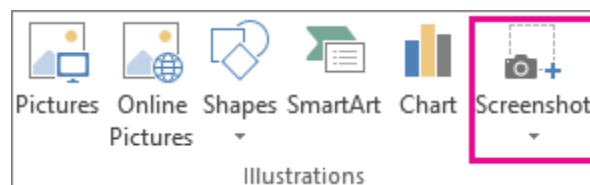
You can quickly and easily add a screenshot to your Office file to enhance readability or capture information without leaving the program that you are working in. This feature is available in Excel, Outlook, PowerPoint, and Word.

Screenshots are useful for capturing snapshots of programs or windows that you have open on your computer. When you click the **Screenshot** button, open program windows are displayed as thumbnails in the **Available Windows** gallery. You can insert the whole program window, or use the **Screen Clipping** tool to select part of a window. Only windows that have not been minimized to the taskbar can be captured.

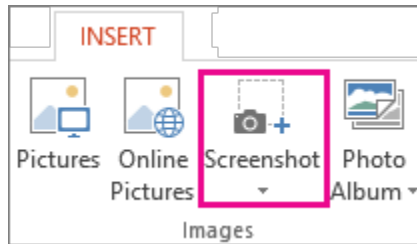
When you choose **Screen Clipping**, your entire window will temporarily become opaque or “frosted over.” After you select the part of the window that you want, your selection will show through this opaqueness.

Note: Only one screenshot at a time can be added. To add multiple screenshots, repeat steps 2 and 3 below.

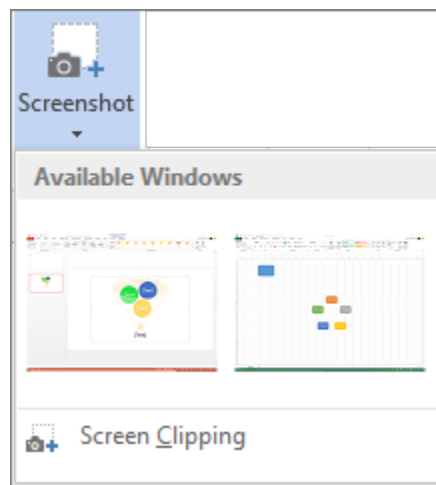
1. Click in the document at the location where you want to add the screenshot.
2. In Excel, Outlook, and Word: On the **Insert** tab, in the **Illustrations** group, click **Screenshot**.



In PowerPoint: On the **Insert** tab, in the **Images** group, click **Screenshot**.



3. The **Available Windows** gallery appears, showing you all the windows that you currently have open. Do one of the following:
 - To insert a screenshot of an entire window into your document, click the thumbnail image of that window.
 - To add a selected portion of the first window shown in the **Available Windows** gallery, click **Screen Clipping**; when the screen turns white and the pointer becomes a cross, press and hold the left mouse button and drag to select the part of the screen that you want to capture.



Tip: If you have multiple windows open, you'll first need to click the window you want to capture before starting the screenshot process. This will move that window to the first position in the **Available Windows** gallery. For example, if you want to take a screen clipping from a web page and insert it into a Word document, first click the screen with the website, and then go directly to your Word document and click **Screenshot**. The screen with the web page will be in the first position in the **Available Windows** gallery, and you can click **Screen Clipping** to select a portion of that screen.

4. The window or portion of the screen you selected is automatically added to your document. You can use the tools on the **Picture Tools** tab to edit and enhance the screenshot.

Excel Tip #4 - Auto Decimal Point

There's nothing more annoying than adding a decimal point, only to have Excel remove it. Or, worse still, adding decimals to every line, even though you're using whole numbers in dollar format -- \$12.00 shouldn't require you to type a decimal point on each line, instead let it Excel do it for you.

This all comes down to formatting, and thankfully, it really couldn't be easier.

1. Open Excel and enter a new or existing workbook.
2. Select the column you'd like to add decimal points to.
3. It doesn't matter if there are no decimals, all decimals, or a mix of the two.
4. Right-click and select Format Cells
5. Under the Number tab, select Currency.
6. The number of decimal points should be set to 2. If not, use the up/down arrows to select the number of decimal places (or just type it in). If it's already set to 2 skip this step.
7. Click OK.

Excel Tip #5 - Enter the Same Data Into Multiple Cells

At one point, you may find yourself needing to enter the same data into a number of different cells. Your natural instinct would be to copy-paste over and over again. But there's a quicker way:

Select all the cells where you need the same data filled in (use CTRL + click to select individual cells that are spread across the worksheet)

In the very last cell you select, type in your data

Use CTRL+ENTER. The data will be filled in for each cell you selected.

Excel Tip #6 - Excel tip: Three cell formats that will make header text fit

In an ordinary sheet, descriptive header text often inflates the width of columns, pushing important data off screen. Moving from screen to screen is tedious and often, there's nothing you can do about it. But, when the problem is the header text, you have choices. In this article, I'll show you three cell formats that reduce the width of the header cells so you can get all of that data back on a single screen.

Figure A shows an example of what often happens when header text exceeds the actual data in the column. What you can't see is that the data range extends to column P--you're missing a lot. You could use a smaller font size, or you could delete some of the header text, but there are better choices. You might consider Shrink to fit, but I admit that it's my least favorite of the three formats.

	A	B	C	D	E	F	G	H	I
1									
2		Membership Number	Last Membership Number	Membership Type	1st Last Name	1st First Name	2nd Last Name	2nd First Name	Number Child
3		100	54 Family	Smith	Mike	Jones	Laura		
4		101	0 Friends	Talbott	Jim	Talbott	Martha		
5		104	23 Individual	Harkins	Susan				
6		103	43 Family	Jones	David	Jones	Nancy		
7									
8									

Figure A: The long headers require wide columns.

To apply this format, select the header cells, B2:P2, and click the Alignment dialog launcher (on the Home tab). On the Alignment tab, check the Shrink to fit option shown in **Figure B**. Or, press Ctrl+1.

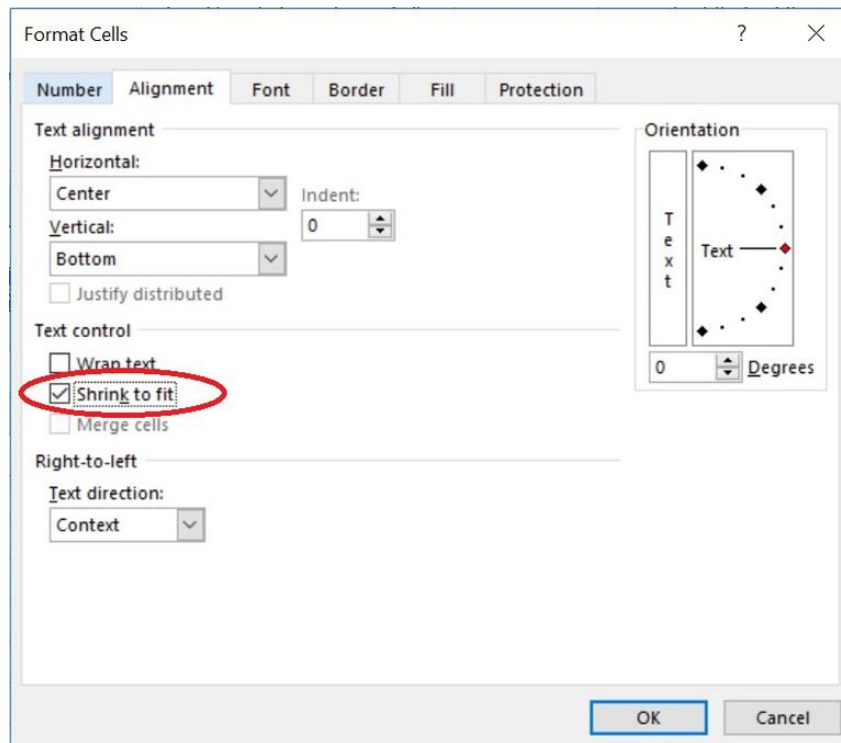


Figure B: Apply the Shrink to fit alignment format.

Figure C shows the results of reducing the width of column C--the effect is fairly dramatic. (You won't see any difference until you reduce the width of the column.)

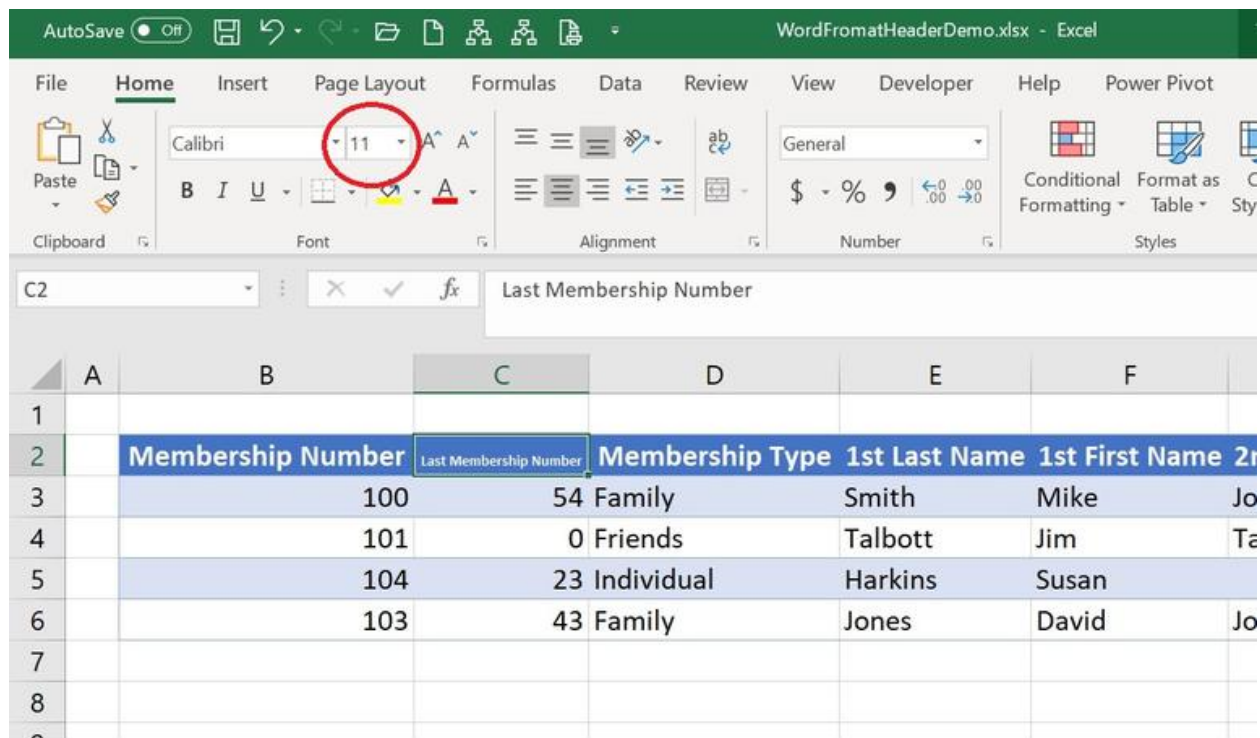


Figure C: Shrink to fit isn't a great option for header text that doesn't fit. The text won't increase if you increase the width of the column. In addition, the font size doesn't actually change. If you check the Font Size control in the Font control, you'll see that it's the same as before. This format has limited use when fitting header text, but you should know it's available.

Before continuing, be sure to remove the Shrink to fit format if you're following along with the example because it'll change the results of the next section, which introduces the Wrap Text format.

Wrap Text format

The Wrap Text format forces text to wrap to multiple lines within a single cell to accommodate the cell's width. It's easy to use, but this format sometimes yields unexpected results and requires a bit of tweaking.

Before applying the format, reduce the width of the column(s) to accommodate the text instead of the headers. Most of the header text will disappear. It's temporary so don't worry. Then, select the header cells, B2:P2, and click Wrap Text in the Alignment group on the Home tab.

As you can see in **Figure D**, you usually have to tweak a column or two--or maybe even all of them. Specifically, columns D and M need to be a bit wider to keep the words Membership and State together. This format won't keep words together automatically. However, we can see all of the data on one screen now.

press Ctrl+z to undo the change and give up because it doesn't help and it looks odd. But the truth is, you're almost there. (The online version doesn't support the cell Orientation format.)

Membership Number	Last Membership Number	Membership Type	1st Last Name	1st First Name	2nd Last Name	2nd First Name	Number Children	Purchase Date	Street Address
100	54	Family	Smith	Mike	Jones	Laura	2	9/17/2018	123 Little Street
101	0	Friends	Talbott	Jim	Talbott	Martha	0	9/18/2018	101 Nancy Street
104	23	Individual	Harkins	Susan			5	9/20/2018	234 Main Street
103	43	Family	Jones	David	Jones	Nancy	3	9/20/2018	567 First Street

Figure F: Apply the Orientation format.

Similarly to the Wrap Text function, the column width is part of the show. **Figure G** shows the result of reducing the column widths to accommodate the data instead of the headers.

Membership Number	Last Membership Number	Membership Type	1st Last Name	1st First Name	2nd Last Name	2nd First Name	Number Children	Purchase Date	Street Address	City	State	ZIP Code	Phone	Email
100	54	Family	Smith	Mike	Jones	Laura	2	9/17/2018	123 Little Street	Nonesuch	KY	55555	5555555555	TheSmiths123@domain.com
101	0	Friends	Talbott	Jim	Talbott	Martha	0	9/18/2018	101 Nancy Street	Nonesuch	KY	55555	5555551234	TheTalbotts111@domain.com
104	23	Individual	Harkins	Susan			5	9/20/2018	234 Main Street	Nonesuch	KY	55555	5555554578	SusanHarkins@domain.com
103	43	Family	Jones	David	Jones	Nancy	3	9/20/2018	567 First Street	Nonesuch	KY	55555	5555559012	TheJones@domain.com

Figure G: Reduce the column widths.

This feature has a number of settings, so if you don't like this one, change it. Press Ctrl+1 and adjust the angle using the Orientation control to the right. You can drag the text line up or down or enter a number in the Degree control. By default, the degree 45 is represented in both spots. **Figure H** shows the result of dragging the Text line to 75. To quickly remove the format, enter 0 in the Degree control.

Membership Number	Last Membership Number	Membership Type	1st Last Name	1st First Name	2nd Last Name	2nd First Name	Number Children	Purchase Date	Street Address	City	State	ZIP Code	Phone	Email
100	54	Family	Smith	Mike	Jones	Laura	2	9/17/2018	123 Little Street	Nonesuch	KY	55555	5555555555	TheSmiths123@domain.com
101	0	Friends	Talbott	Jim	Talbott	Martha	0	9/18/2018	101 Nancy Street	Nonesuch	KY	55555	5555551234	TheTalbotts111@domain.com
104	23	Individual	Harkins	Susan			5	9/20/2018	234 Main Street	Nonesuch	KY	55555	5555554578	SusanHarkins@domain.com
103	43	Family	Jones	David	Jones	Nancy	3	9/20/2018	567 First Street	Nonesuch	KY	55555	5555559012	TheJones@domain.com

Figure H: Change the degree of the angle.

Excel Tip #7 - Create an Excel Data Table to compare multiple results

To illustrate their use, we'll add a data table to the simple mortgage calculator shown in **Figure A**. As is, you can change any of the input values to change the results. We won't spend any time on building the calculator. You can download the demo workbook or refer to **Table A** for the formulas. The IFERROR() function isn't necessary but consider using it to handle errors if you plan to distribute the workbook to others.

Figure A

	A	B	C	D	E	F	G
1	Mortgage Calculator						
2							
3	Input Cells			Result Cells			
4	Loan Amount	\$150,000.00		Financed Amount	\$140,000.00		
5	Deposit	\$10,000.00		Monthly Payment	\$620.87		
6	Term (Years)	30		Total Repaid	\$223,514.54		
7	Interest Rate	3.40%		Total Interest	\$83,514.54		
8							
9							

We'll add a data table to this simple mortgage calculator.

Table A

Cell	Formula	Format
B4:B5		Currency
B6		General
B7		Percentage with two decimal places
E4	=B4-B5	Currency
E5	=IFERROR(PMT(B7/12, B6*12,-B4+B5),0)	Currency
E6	=IFERROR(E5*B6*12,0)	Currency
E7	=IFERROR(E6-E4,0)	Currency

Now, let's suppose you want to compare results when the interest rate changes, not once, but for several rates--that's where a data table comes in. The first step is to enter the data table's labels. They should be easy to glean from the original sheet. In addition, the data table's first column should contain your variable. In this case, that's the changing interest rate.

I recommend using AutoFill to create a list of interest rates as shown in **Figure B**. If you must use formulas, be sure to replace the formulas with values because data tables don't evaluate formulas in the first column. It doesn't matter what values you begin and end the list with.

Figure B

	A	B	C	D	E	F
2						
3	Input Cells			Result Cells		
4	Loan Amount	\$150,000.00		Financed Amount	\$140,000.00	
5	Deposit	\$10,000.00		Monthly Payment	\$620.87	
6	Term (Years)	30		Total Repaid	\$223,514.54	
7	Interest Rate	3.40%		Total Interest	\$83,514.54	
8						
9						
10	Interest Rate	Monthly Payment	Total Repaid	Total Interest		
11	2.50%					
12	3.00%					
13	3.50%					
14	4.00%					
15	4.50%					
16	5.00%					
17	5.50%					
18	6.00%					
19	6.50%					
20	7.00%					
21	7.50%					
22	8.00%					
23	8.50%					
24	9.00%					
25	9.50%					
26	10.00%					
27	10.50%					
28	11.00%					
29	11.50%					
30						

Add labels and then create the list of changing variables in the data table's first column.

The next step is to enter the data table's references as follows:

1. Select B11 and enter =E5 (the cell that contains the monthly payment formula in the result cell section of your original sheet).
2. Select C11 and enter =E6.
3. Select D11 and enter =E7.

Figure C

	A	B	C	D	E	F	G
2							
3	Input Cells			Result Cells			
4	Loan Amount	\$150,000.00		Financed Amount	\$140,000.00		
5	Deposit	\$10,000.00		Monthly Payment	\$620.87		
6	Term (Years)	30		Total Repaid	\$223,514.54		
7	Interest Rate	3.40%		Total Interest	\$83,514.54		
8							
9							
10	Interest Rate	Monthly Payment	Total Repaid	Total Interest			
11	2.50%	\$620.87	\$223,514.54	\$83,514.54			
12	3.00%						
13	3.50%						
14	4.00%						
15	4.50%						
16	5.00%						
17	5.50%						
18	6.00%						
19	6.50%						
20	7.00%						
21	7.50%						
22	8.00%						
23	8.50%						
24	9.00%						
25	9.50%						
26	10.00%						
27	10.50%						
28	11.00%						
29	11.50%						
30							

Add references to the original sheet's formulas.

There's one more step to take before you generate the data table. The variable input cell--in this case, that's the interest rate value--must equal the first value in your data table. The first interest rate in the data table is 2.5%. You must change the input value in B7 to 2.5% before you generate the data table, as shown in **Figure D**. Do not skip this step unless the values are the same.

Figure D

	A	B	C	D	E	F
1	Mortgage Calculator					
2						
3	Input Cells			Result Cells		
4	Loan Amount	\$150,000.00		Financed Amount	\$140,000.00	
5	Deposit	\$10,000.00		Monthly Payment	\$553.17	
6	Term (Years)	30		Total Repaid	\$199,140.93	
7	Interest Rate	2.50%		Total Interest	\$59,140.93	
8						
9						
10	Interest Rate	Monthly Payment	Total Repaid	Total Interest		
11	2.50%	\$553.17	\$199,140.93	\$59,140.93		
12	3.00%					
13	3.50%					
14	4.00%					

Now, you're ready to generate the data table as follows:

1. Select the data table range. In this case, that's A11:D29 (don't include the labels in row 10).
2. Click the Data tab.
3. Choose Data Table from the What-If Analysis option in the Data Tools group (**Figure E**).

Figure E

In the resulting dialog box, enter the input cell, B7, in the Column Input Cell because the interest rate values are in a column vs. a row (**Figure F**). This is the input value Excel will change for each row in the data table.

Click OK and format the rest of the table as necessary.

The Data Table option is in the Data Tools group.

Figure F

Data Table
?
X

Row input cell:

Column input cell:

Reference the input cell that changes--in this case, it's the interest rate in B7.

The resulting data table in **Figure G** shows how the monthly payment and other values change as the interest rate changes. By combining the original calculator sheet with a data table, you have the best of both worlds. You can still use the calculator portion to change all of the input values, and the data table will reflect the changing values with the fixed set of interest ranges (2.5% to 11.50%) for each mortgage scenario.

Figure G

	A	B	C	D	E
10	Interest Rate	Monthly Payment	Total Repaid	Total Interest	
11	2.50%	\$553.17	\$199,140.93	\$59,140.93	
12	3.00%	\$590.25	\$212,488.43	\$72,488.43	
13	3.50%	\$628.66	\$226,318.52	\$86,318.52	
14	4.00%	\$668.38	\$240,617.31	\$100,617.31	
15	4.50%	\$709.36	\$255,369.40	\$115,369.40	
16	5.00%	\$751.55	\$270,558.10	\$130,558.10	
17	5.50%	\$794.90	\$286,165.66	\$146,165.66	
18	6.00%	\$839.37	\$302,173.46	\$162,173.46	
19	6.50%	\$884.90	\$318,562.28	\$178,562.28	
20	7.00%	\$931.42	\$335,312.46	\$195,312.46	
21	7.50%	\$978.90	\$352,404.11	\$212,404.11	
22	8.00%	\$1,027.27	\$369,817.35	\$229,817.35	
23	8.50%	\$1,076.48	\$387,532.40	\$247,532.40	
24	9.00%	\$1,126.47	\$405,529.80	\$265,529.80	
25	9.50%	\$1,177.20	\$423,790.52	\$283,790.52	
26	10.00%	\$1,228.60	\$442,296.07	\$302,296.07	
27	10.50%	\$1,280.64	\$461,028.60	\$321,028.60	
28	11.00%	\$1,333.25	\$479,970.99	\$339,970.99	
29	11.50%	\$1,386.41	\$499,106.88	\$359,106.88	
30					

The data table shows payments and totals for many interest rates.

Once the data table is in place, you can't change any of the referencing cells in columns B, C, and D. Excel protects those cells. In addition, the data table formulas are a series of =TABLE() functions--this function is just for show. You can't use it in any other context.

Excel Tip #8 - Excel XLOOKUP Function

G4		✕ ✓ fx		=XLOOKUP(F4,B4:B12,D4:D12)					
	A	B	C	D	E	F	G	H	I
1									
2									
3		Planet	Satellites	Diameter (km)		Planet	Diameter		
4		Mercury	0	4,879		Mars	6,792	← result	
5		Venus	0	12,104					
6		Earth	1	12,756					
7		Mars	2	6,792					
8		Jupiter	67	142,984					
9		Saturn	200	120,536					
10		Uranus	27	51,118					
11		Neptune	13	49,528					
12		Pluto	5	2,306					
13									
14		lookup		return					
15		array		array					
16									

Summary

The Excel XLOOKUP function is a modern and flexible replacement for older functions like VLOOKUP, HLOOKUP, and LOOKUP. XLOOKUP supports approximate and exact matching, wildcards (* ?) for partial matches, and lookups in vertical or horizontal ranges.

Purpose

Find values in range or table

Return value

Best match (exact or approximate)

Syntax

=XLOOKUP (lookup, lookup_array, return_array, [not_found], [match_mode], [search_mode])

Arguments

- **lookup** - The lookup value.
- **lookup_array** - The array or range to search.
- **return_array** - The array or range to return.
- **not_found** - [optional] Value to return if no match found.
- **match_mode** - [optional] 0 = exact match (default), -1 = exact match or next smallest, 1 = exact match or next larger, 2 = wildcard match.
- **search_mode** - [optional] 1 = search from first (default), -1 = search from last, 2 = binary search ascending, -2 = binary search descending.

Usage notes

XLOOKUP is a modern replacement for the VLOOKUP function. It is a flexible and versatile function that can be used in a wide variety of situations.

XLOOKUP can find values in vertical or horizontal ranges, can perform approximate and exact matches, and supports wildcards (* ?) for partial matches. In addition, XLOOKUP can search data starting from the first value or the last value (see match type and search mode details below). Compared to older functions like [VLOOKUP](#), [HLOOKUP](#), and [LOOKUP](#), XLOOKUP offers several key advantages.

Not found message

When XLOOKUP can't find a match, it returns the #N/A error, like other match functions in Excel. Unlike the other match functions, XLOOKUP supports an optional argument called *not_found* that can be used to override the #N/A error when it would otherwise appear. Typical values for *not_found* might be "Not found", "No match", "No result", etc. When providing a value for *not_found*, enclose the text in double quotes ("").
Note: Be careful if you supply an empty string ("") for not_found. If no match is found, XLOOKUP will display nothing instead of #N/A. If you want to see the #N/A error when a match isn't found, omit the argument entirely.

Match type

By default, XLOOKUP will perform an *exact match*. Match behavior is controlled by an optional argument called **match_type**, which has the following options:

Match type	Behavior
0 (default)	Exact match. Will return #N/A if no match.
-1	Exact match or next smaller item.
1	Exact match or next larger item.
2	Wildcard match (*, ?, ~)

Search mode

By default, XLOOKUP will start matching from the first data value. Search behavior is controlled by an optional argument called **search_mode**, which provides the following options:

Search mode	Behavior
1 (default)	Search from first value
-1	Search from last value (reverse)
2	Binary search values sorted in ascending order
-2	Binary search values sorted in descending order

Binary searches are very fast, but *data must be sorted as required*. If data is not sorted properly, a binary search can return invalid results that look perfectly normal.

Example #1 - basic exact match

By default, XLOOKUP will perform an exact match. In the example below, XLOOKUP is used to retrieve Sales based on an exact match on Movie. The formula in H5 is:

```
=XLOOKUP(H4,B5:B9,E5:E9)
```

		X		✓	fx		=XLOOKUP(H4,B5:B9,E5:E9)	
	A	B	C	D	E	F	G	H
1								
2		XLOOKUP - basic exact match						
3								
4		Movie	Year	Rank	Sales		Movie	Toy Story
5		Fargo	1996	5	\$61 m		Sales	\$362 m
6		L.A. Confidential	1997	4	\$126 m			
7		The Sixth Sense	1999	1	\$673 m			
8		Toy Story	1995	2	\$362 m			
9		Unforgiven	1992	3	\$159 m			
10								
11								

Example #2 - basic approximate match

To enable an approximate match, provide a value for the "match_mode" argument. In the example below, XLOOKUP is used to calculate a discount based on quantity, which requires an approximate match. The formula in F5 supplies -1 for match_mode to enable approximate match with "exact match or next smallest" behavior:

```
=XLOOKUP(E5,B5:B9,C5:C9,-1)
```

F5							
	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

XLOOKUP basic approximate match

Quantity	Discount	Quantity	Result
0	0%	28	10%
10	5%		
25	10%		
50	20%		
100	25%		

Example #3 - two-way lookup

XLOOKUP can be used to perform a two-way lookup, by [nesting](#) one XLOOKUP inside another. In the example below, the "inner" XLOOKUP retrieves an entire row (all values for Glass), which is handed off to the "outer" XLOOKUP as the return array. The outer XLOOKUP finds the appropriate group (B) and returns the corresponding value (17.25) as the final result.

=XLOOKUP(I6,C4:F4,XLOOKUP(I5,B5:B9,C5:F9))

I7									
	A	B	C	D	E	F	G	H	I
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									

XLOOKUP two-way lookup

	A	B	C	D	Material	Group
Vinyl	10.00	11.50	13.23	15.21	Glass	
Wood	12.00	13.80	15.87	18.25		
Glass	15.00	17.25	19.84	22.81		
Steel	18.00	20.70	23.81	27.38		
Titanium	23.00	26.45	30.42	34.98		

Material	Group
Glass	B
Result	17.25

Example #5 - not found message

Like other lookup functions, if XLOOKUP does not find a value, it returns the #N/A error. To display a custom message instead of #N/A, provide a value for the optional "not found" argument, enclosed in double quotes (""). For example, to display "Not found" when no matching movie is found, based on the worksheet below, use:

=XLOOKUP(H4,B5:B9,E5:E9,"Not found")

Formula bar: `=XLOOKUP(H4,B5:B9,E5:E9,"Not found")`

	A	B	C	D	E	F	G	H
1								
2		XLOOKUP - not found						
3								
4								
5								
6								
7								
8								
9								
10								

Movie	Year	Rank	Sales
Fargo	1996	5	\$61 m
L.A. Confidential	1997	4	\$126 m
The Sixth Sense	1999	1	\$673 m
Toy Story	1995	2	\$362 m
Unforgiven	1992	3	\$159 m

Movie	Godzilla
Sales	Not found

You can customize this message as you like: "No match", "Movie not found", etc.


Example #6 - complex criteria

With the ability to handle arrays natively, XLOOKUP can be used with complex criteria. In the example below, XLOOKUP is matching the first record where: account begins with "x" *and* region is "east" *and* month is not April:

=XLOOKUP(1,(LEFT(B5:B16)="x")*(C5:C16="east")*NOT(MONTH(D5:D16)=4),B5:E16)

Formula Bar: `=XLOOKUP(1,(LEFT(B5:B16)="x")*(C5:C16="east")*NOT(MONTH(D5:D16)`

	A	B	C	D	E	F	G	H	I	J	K
1											
2		XLOOKUP with complex multiple criteria									
3											
4		Account	Region	Date	Amount						
5		X3000-150	West	11-Apr-20	24,000						
6		Z3000-050	West	14-Apr-20	21,750						
7		X1020-030	East	20-Apr-20	11,250						
8		X3000-050	East	11-May-20	4,500						
9		X3000-150	East	25-May-20	12,750						
10		Z1020-025	West	9-Jun-20	7,500						
11		X1020-015	East	11-Jun-20	19,500						



Account	Region	Date	Amount
X3000-050	East	11-May-20	4,500

- account begins with "x" AND
- region is "east" AND
- month is NOT April

XLOOKUP benefits

XLOOKUP offers several important advantages, especially compared to VLOOKUP:

- XLOOKUP can lookup data to the right or left of lookup values
- XLOOKUP can return multiple results (example #3 above)

- XLOOKUP defaults to an exact match (VLOOKUP defaults to approximate)
- XLOOKUP can work with vertical and horizontal data
- XLOOKUP can perform a reverse search (last to first)
- XLOOKUP can return entire rows or columns, not just one value
- XLOOKUP can work with arrays natively to apply complex criteria

Notes

1. XLOOKUP can work with both vertical and horizontal arrays.
2. XLOOKUP will return #N/A if the lookup value is not found.
3. The **lookup_array** must have a dimension compatible with the **return_array** argument, otherwise XLOOKUP will return #VALUE!
4. If XLOOKUP is used between workbooks, both workbooks must be open, otherwise XLOOKUP will return #REF!.

Excel Tip #9 - Goal Seek

Goal Seek is a built-in Excel tool that allows you to see how one data item in a formula impacts another. You might look at these as “cause and effect” scenarios. It’s useful to answer “what if” type questions because you can adjust one cell entry to see the result. The tool is often used in finance, sales, and forecasting scenarios, but there are other uses.

For example, you might be looking at your local election results and see:

	Votes	% of Votes
YES	4478	63.90 *
NO	2530	36.10

Total	7008	100
-------	------	-----

* Needs approval from 2/3 of the voters

In our example, the YES votes are a majority, but shy of the required 2/3 approval to win the election. People quickly realize they were close, but which item do they change to find out how close. What would've made a difference?

Using Goal Seek we can change the value of one variable and see how the results change. This would allow you to answer these types of questions.

- *How many more YES votes were needed to win the election?*
- *If 500 more people voted could the YES team have won?*

In each of these questions, the goal is to change one data value to see if the YES percentage went over that two-thirds mark or 67%. Rather than haphazardly changing cell values to see the results, Goal Seek can find the answers.

How to Use Excel Goal Seek

1. Create a spreadsheet in Excel that has your data. In the example below, the green cells have formulas to calculate the percentage and sum totals.

	A	B	C	D	E
1					
2					
3	Bond Election		Votes	%	
4		YES	4478	0.64	
5		NO	2530	0.36	
6		TOTAL	7008		
7					
8					

Final election results

2. Click the cell you want to change. This is called the “**Set cell**”. In my example, this will be D4.
3. From the **Data** tab, select the **What if Analysis...** button
4. Select **Goal seek...** from the drop down menu
5. In the **Goal Seek** dialog, enter the new “what if” amount in the **To value:** text box.

	A	B	C	D	E	F	G	H
1								
2								
3	Bond Election		Votes	%				
4		YES	4478	0.64				
5		NO	2530	0.36				
6		TOTAL	7008					
7								
8								
9								
10								
11								
12								
13								
14								
15								

Goal Seek

Set cell: SDS4

To value: 0.67

By changing cell:

OK

Cancel

Goal Seek input dialog

In this example, we're asking Excel to replace the contents of cell D4 which is 0.64 with 0.67. This is the percentage needed to win the election. Technically, we need 66.7% to win, but since Goal Seek has an approximation algorithm, I don't want to run the risk of Excel rounding down.

- We also need to tell Excel which cell to change. Since we wanted to know the number of YES votes, we'll click C4.

	A	B	C	D	E	F	G	H
1								
2								
3	Bond Election		Votes	%				
4		YES	4478	0.64				
5		NO	2530	0.36				
6		TOTAL	7008					
7								
8								
9								
10								
11								
12								
13								
14								
15								

Goal Seek

Set cell: SDS4

To value: 0.67

By changing cell: SC\$4

OK

Cancel

Changing the percentage value to see the impact

- Click **OK**. Excel will overwrite the previous cell value with the new one.

The image shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H
1								
2								
3	Bond Election		Votes	%				
4		YES	5123	0.67				
5		NO	2530	0.33				
6		TOTAL	7653					
7								
8								
9								
10								
11								
12								
13								
14								
15								

A Goal Seek Status dialog box is open, showing:

- Goal Seeking with Cell D4 found a solution.
- Target value: 0.67
- Current value: 0.67
- Buttons: Step, Pause, OK, Cancel

A red arrow points from the 'OK' button to the cell D4 (0.67) in the spreadsheet.

Seek returns new values

- If you wish to accept the new value, click **OK**.

Excel Tip #10 - Watch Window

Have you ever changed assumptions in a workbook and then rearranged the workbook or worksheets to view the impact of the change on some calculation of interest, only to change the assumptions again and again, each time rearranging the workbook to view the results? The **Watch Window** allows users to view in the current window the changes in other cells resulting from changes in assumptions. In fact, the Watch Window allows users to track cell properties of every type (workbook, worksheet, defined name, cell, value, and formula), while the cells are out of view. Essentially, the Watch Window is a cell-management tool, providing users with information regarding selected cells in the current or other workbooks.

Click **Watch Window** on the **Formulas** tab of the Ribbon to open the Watch Window. In default, the Watch Window floats on the face of the worksheet, but it can be docked on any edge of the worksheet by dragging it to the desired location. Cells or ranges of cells can be added to the Watch Window by highlighting the cells of interest and clicking **Add Watch** as shown in **Figure 1**.

The screenshot shows the Microsoft Excel interface. The **FORMULAS** ribbon is active, displaying the **Formula Auditing** group with the **Watch Window** icon highlighted by a red box. A red arrow points from this icon to the **Watch Window** task pane, which is open in the bottom right corner.

The spreadsheet data is as follows:

	A	B	C	D	E
94					
95	After-Tax Internal Rate of Return	8.35%			
96	Net Present Value @ After-Tax Internal Rate of Return	\$ 1,562,910			
97					

The **Watch Window** task pane displays the following table:

Book	Sheet	Name	Cell	Value	Formula
Figure 117 - Watch Window.xlsx	Adj Model	_IRR	B95	8.35%	=IRR(B93:BA93,0.1)
Figure 117 - Watch Window.xlsx	Adj Model	_NPV	B96	\$1,562,910	=NPV(G9,C93:BA93)+B93

Defined watches are saved when a workbook is saved so that they will be available the next time the workbook containing them is opened, even if the Watch Window has been closed prior to saving the workbook.