



MS Excel Help Sheet

Introduction to MS Excel

Excel is Microsoft's spreadsheet application. It is similar to Google Sheets or Apple's Numbers software. Excel uses **sheets** to organise data. Each sheet contains a large number of boxes called **cells** that are ordered in **rows** and **columns**.

Use these instructions and tips to complete activities from The School's Observatory that require the use of spreadsheets. Please be aware, this Help Sheet does not tell you everything about Excel. Excel contains many more functions and tools that are not covered here.

1 Input and format data

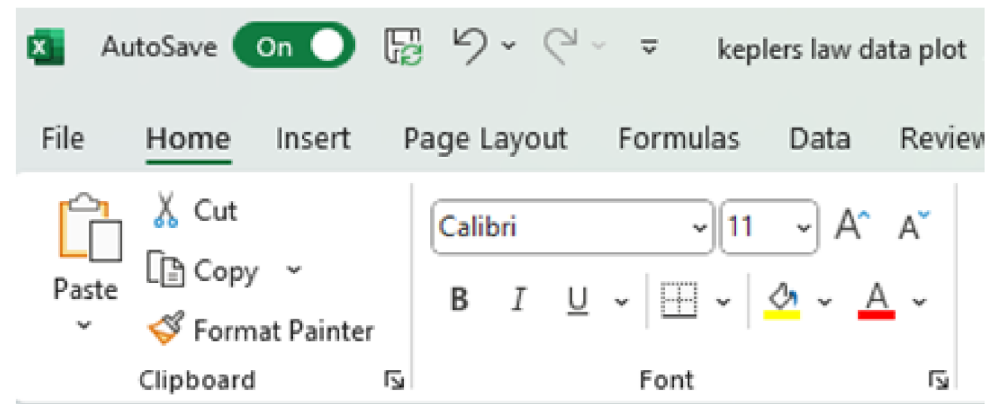
Each cell's location is identified by a letter and a number called a **cell reference**. The letter tells you the **column**, the number tells you the **row** - for example, cell B4 is the cell in the 4th row of column B.

To enter information in a sheet, click the cell you want to enter information into. Enter the information as text or numbers. The result will appear in the cell.

Use icons in the 'Home' tab to change the colour, font, size, and format of cells. There is also an undo button in the 'Home' tab.

Get Stuck? Here's what to do

- Use Microsoft's support website <https://support.microsoft.com/en-us/excel> (bear in mind that it's written for business use with more detail than you may need)
- Search online! But, be careful because some of the advice may be old and not work for the version of Excel you have. To find the most recent and helpful information, use Google's 'Tools to only show you results from the last year.'





2 Use simple formulae

Excel only knows it has to do a calculation if the contents of a cell start with an **equals sign** “=”. So any equations or formulae you use must start with the equals sign.

Excel uses different **keyboard signs** for different mathematical operations.

Here is a list of common operator signs:

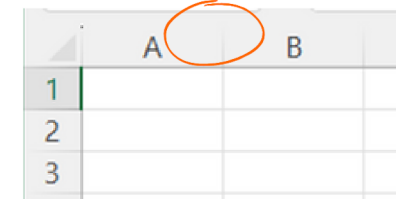
Operator	Excel sign	Operator	Excel sign
Equals	=	Square	^2
Multiply	*	Cube	^3
Divide	/	Square root	^(1/2)
Add	+	Cubic root	^(1/3)
Subtract	-		

Sometimes, you may need to include the **value of a cell** in your formula. Rather than copying and typing out the value you can just click on the cell or type its cell reference. This example shows a formula that will calculate the cube of the value in cell A3.

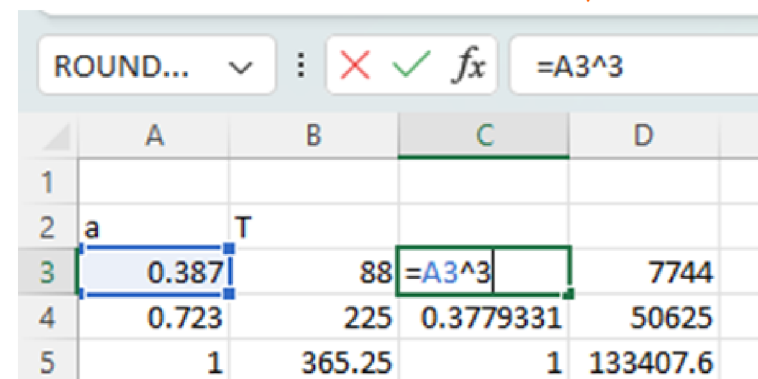
You can highlight **multiple cells** if you want to refer to a range of them. Alternatively, you can use the colon (:) to tell Excel to include all cells within a range. For example, A1:A20 will include all cells in column A from rows 1 to 20. Or another example, A1:C20 will include all cells in columns A, B and C from rows 1 to row 20.

Tips!

1. If the result of your formula appears as “#####” the cell is not wide enough. Hover over the dividing line between two columns, e.g. A and B, and you can drag the column to be wider.



2. Click on a cell to view and edit the formula in the formula bar.





3 Use relative and absolute references

By default, a cell reference is a **relative reference**. If you refer to cell A3 as part of a formula in cell C2, Excel will read information from the cell 2 columns to the left and one row below. If you move the formula, the reference in the formula will change.

Sometimes you want the formula to refer to the same row, column, or cell, no matter where the formula is. For this, you need to use an **absolute reference**.

To create an absolute reference, add a **dollar sign “\$”** in front of the parts of the cell reference you want to stay the same. For example:

- \$A1 will always refer to column A
- A\$1 will always refer to row 1
- \$A\$1 will always refer to cell A1

If you are doing the same thing to several cells, you can copy and paste the formula rather than type it in each cell, but check you have used absolute and relative references correctly!

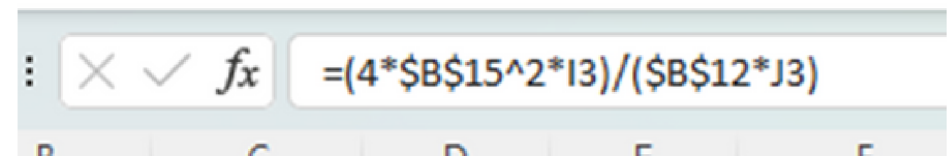
4 Use more complex formulae

Often scientific formulas have many elements that use difference operators and values. Excel follows the **order of mathematical operations** (\times and \div , before $+$ and $-$). Use parenthesis “()” to separate elements of your formula. And check your answers make sense!

Tip!

Rather than copying and pasting, you can use AutoFill:

1. Put the mouse pointer over the bottom right corner of the cell you want to copy. It should become a small plus sign.
2. Click and hold the left mouse button and drag the plus sign over the cells you want to fill.
3. Release the mouse button and the cells will fill in automatically.





5 Use functions

Functions perform common calculations (e.g. sum, mean average, count, max). Excel has a bank of functions, ready for you to use. Each function begins with an equals sign, followed by the **function name**.

If you know the name of the function, you can type it into the cell. Or you can find and select functions using the library in the 'Formulas' tab. Most of the ones you need should be in the 'Math & Trig' list.

You must include a pair of parenthesis “()” after the name of the function. Put the values or cell reference inside the parenthesis. Excel will only apply the function to the information you include within the parenthesis.

Here are the names of some common functions:

Function	Excel name
Sum of values	=SUM
Mean average	=AVERAGE
Count the number of cells containing values	=COUNT
Return maximum value	=MAX
Return minimum value	=MIN
Logarithm to base 10	=LOG10
Value of pi (p)	=PI
Square root (alternative to $^{1/2}$)	=SQRT

The screenshot shows an Excel spreadsheet with two columns, 'a3' and 'T2', containing numerical values in scientific notation. The values in column 'a3' are: 1.94056E+32, 1.26535E+33, 3.34807E+33, 1.17578E+34, 4.70766E+35, 2.93448E+36, 2.35864E+37, and 9.20349E+37. The values in column 'T2' are: 5.78087E+13, 3.77914E+14, 9.95882E+14, 3.52323E+15, 1.40996E+17, 8.63633E+17, 7.02694E+18, and 2.7047E+19. Below the table, the formula bar shows the formula '=MAX(I3:I10)' and a tooltip that reads 'MAX(number1, [number2], ...)'.

a3	T2
1.94056E+32	5.78087E+13
1.26535E+33	3.77914E+14
3.34807E+33	9.95882E+14
1.17578E+34	3.52323E+15
4.70766E+35	1.40996E+17
2.93448E+36	8.63633E+17
2.35864E+37	7.02694E+18
9.20349E+37	2.7047E+19

=MAX(I3:I10)

MAX(number1, [number2], ...)

Tip!

For a list of all functions, click a cell and press SHIFT+F3.



6 Create a chart

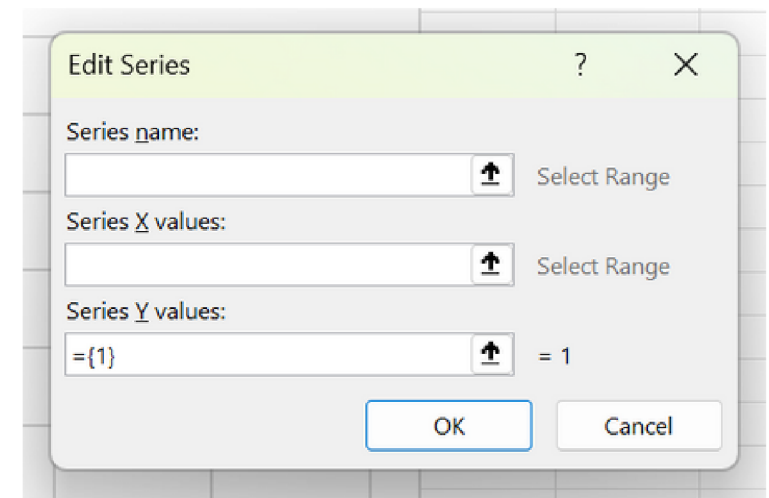
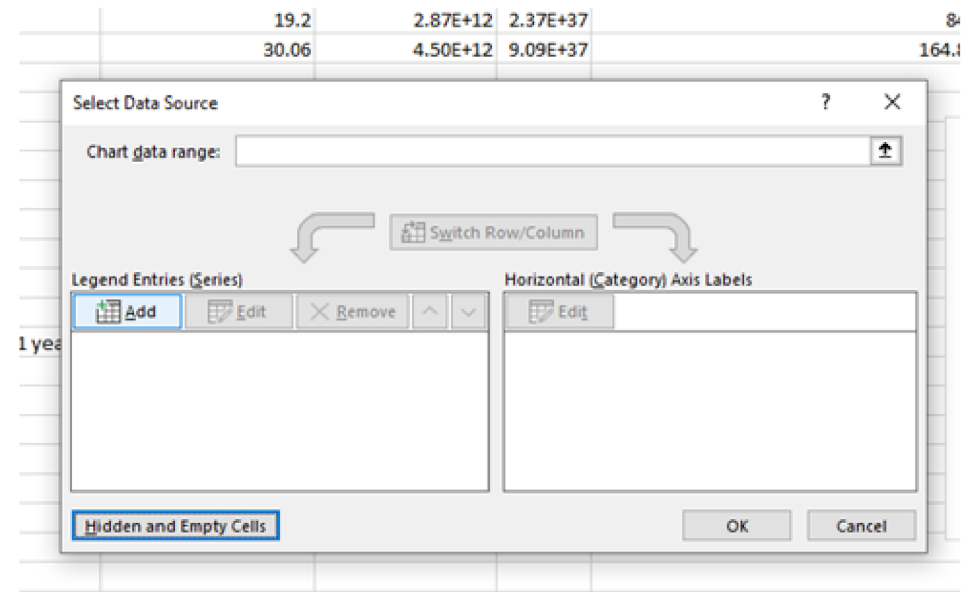
Charts and graphs are a great way to see your data. Looking at a chart or graph can sometimes reveal information that could be missed by just looking at a table of data.

Excel can create various charts and graphs using data entered into a sheet.

Insert a chart using the 'Insert' tab and select the type of chart you want. When you click on the empty chart, the 'Chart Design' and 'Format' tabs appear.

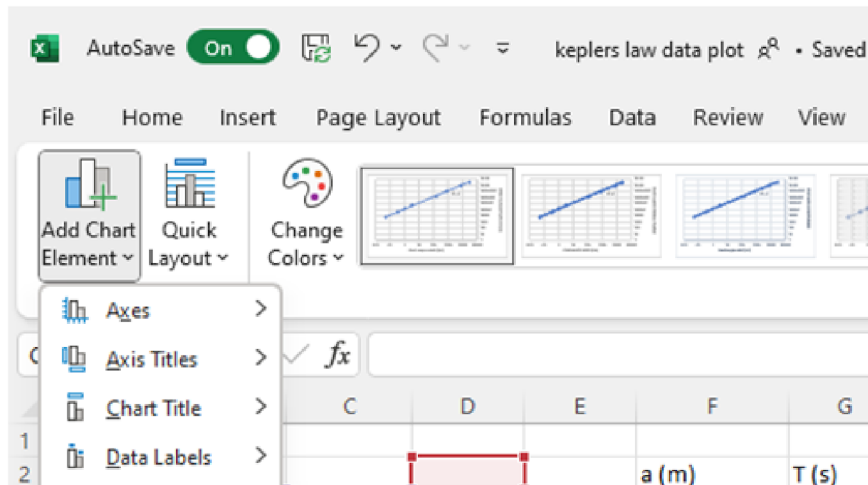
Add data to your chart by following these steps:

1. Choose the 'Select Data' tool from the Chart Design tab.
2. Click the 'Add' button to add a series.
3. Enter a name for your series (this will be used in any legends or keys on the chart).
4. Enter the series values by clicking and highlighting the cells you want to plot (for a scatter plot, you will need to add X values and Y values)
5. Click OK.

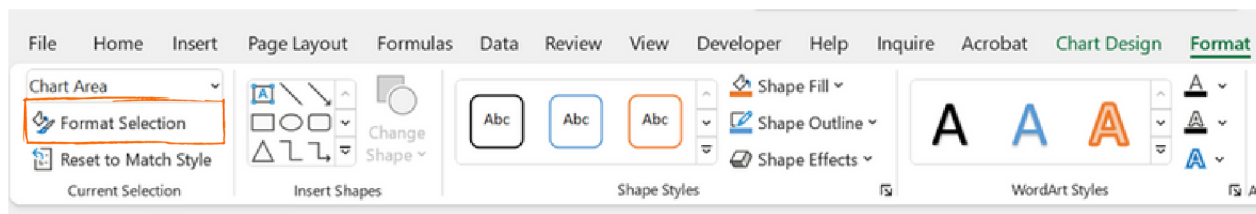




Add elements like axis titles, trendlines, data labels, etc by using the ‘Add chart element’ tool in the ‘Chart Design’ tab.



Format the chart, the data, a trendline, the axis – whatever you have clicked on – by using the ‘Format Selection’ tool in the ‘Format’ tab.



When you are happy with your chart, you can copy and paste it into a document or report. Or, use the right mouse button to reveal more options including ‘Save as Picture’.

Tip!

For astronomy, values on axes are often in reverse order. You can set this, and change where the labels appear, in the axis options when you format the axis.

