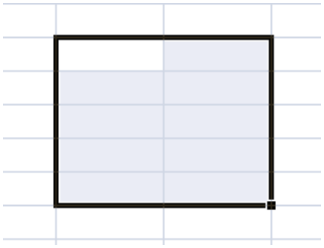
Using LINEST Function in Excel

The LINEST function in Excel performs a least squares fitting function that produces the uncertainty values for fitted values. The following is a step by step procedure to use LINEST in Excel:

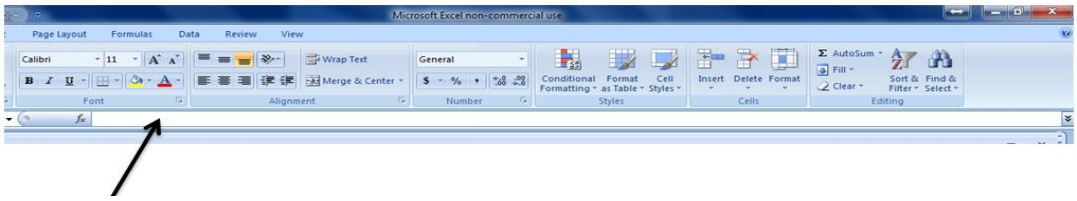
1. First you must input your data. In Excel data points are placed in columns and rows as follows. Remember to always include headings and units for your data.

	A	B
1	X-Position(m)	Time(s)
2	50	0.89
3	63	0.702539683
4	74	0.581081081
5	86	0.52
6	94	0.457446809
7	112	0.383928571
8	125	0.344
9	138	0.311594203
10	156	0.255641026
11	168	0.255952381
12	186	0.231182796
13	195	0.190512821
14	204	0.210784314
15	223	0.202825112
16	249	0.167690763
17	256	0.17796875
18	278	0.154676259
19	300	0.143333333

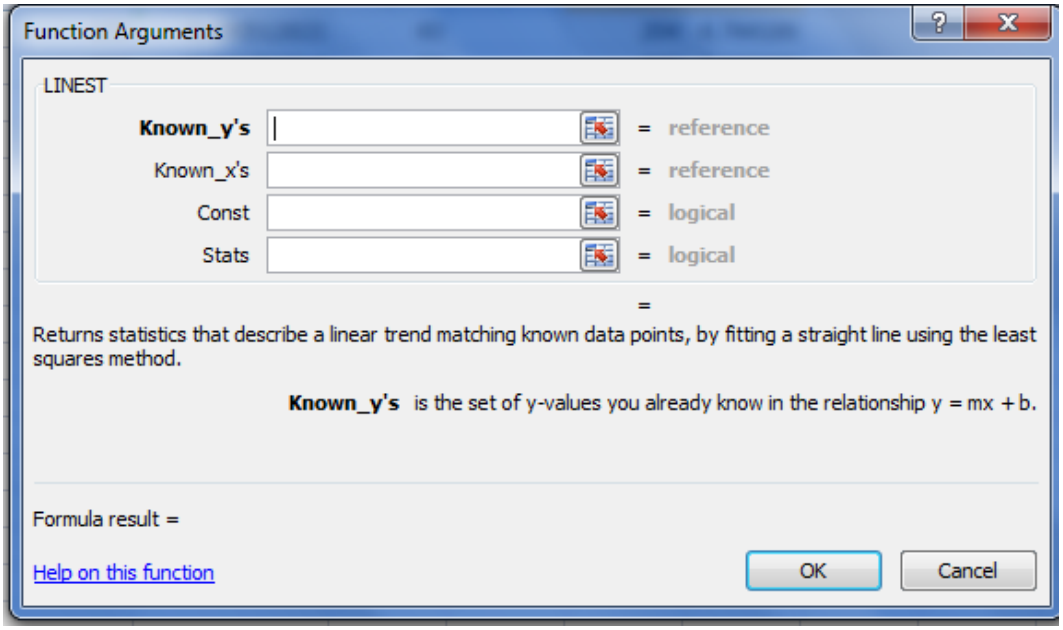
2. LINEST is an array function. This means that the output of the function requires more than one cell. In order to perform the LINEST function, highlight 5 rows and two columns as shown below:



3. At the top of the screen find the Excel Function bar:

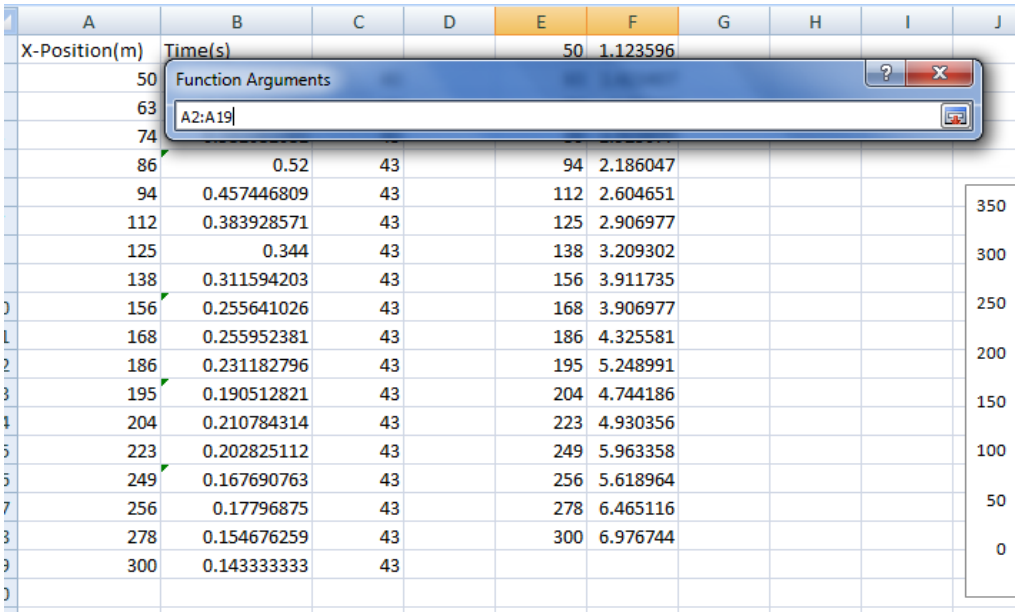


4. Click on the "fx" icon. You will be prompted to select a function. Select "LINEST." In order to find it faster, use the "Search for a function tool" by typing in "LINEST." Click "OK".
5. You will now be given a prompt as follows:



Click the icon to the right of the "Known_y's" dialog box. (It looks like a small Excel sheet with a red arrow in the image above).

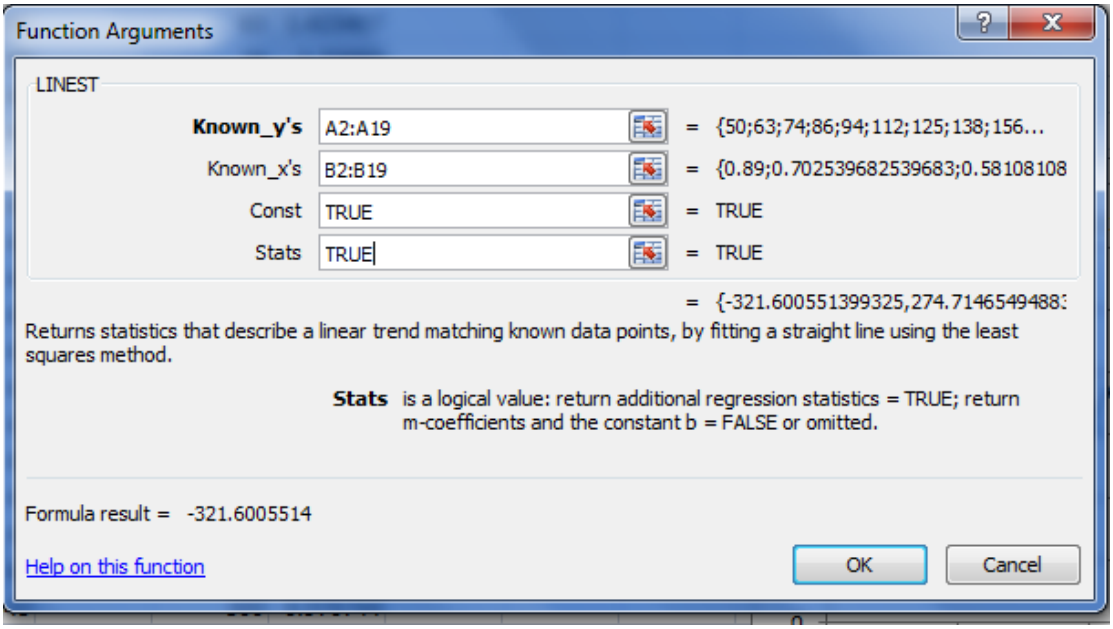
6. Use your mouse to highlight the data that will be on the y-axis of your plot.



Notice that the highlighted data cells are placed in the dialog box titled "Function Arguments." They are reference as A2:A19, which tells Excel that the data cells from A2 to A19 have been

selected. When you have highlighted the "Known_y's" click the icon with the red arrow and small spreadsheet to the right of the "Function Arguments" dialog box.

7. You will be brought back to the LINEST Function Window. Now click the icon next to the "Known_x's" dialog box and select the data that will be plotted along the x-axis of your graph exactly as before.
8. You will once again be brought back to the LINEST Function Window. The with only two dialog boxes without anything input. In both boxes type "TRUE". Without quotations. The LINEST Function Window should look like:



The first "TRUE" indicates that you want the fitted line to take the form " y = mx + b". The second "TRUE" indicates that you want error estimates to be listed.

9. DO **NOT** CLICK "OK". LINEST is an array function and requires a special command to indicate it should run. On a PC running hold down the "CTRL" and "Shift" keys and then hit "ENTER". On a MAC, hold down the "Apple" key and press "Return". All of the data cells you initially highlighted should be filled.

slope	-321.601	274.7147	intercept
uncertainty in slope	43.69345	17.46596	uncertainty in intercept
r^2	0.771999	37.93142	
	54.17524	16	
	77946.93	23020.68	

10. The cells in the center is the information determined by LINEST. The columns on the far left and far right state what each cell corresponds to. The extra cells without any information are also useful information for determining the uncertainty of the LINEST fitting. For our purposes, the r^2 value will be the best indication of how well the function is fitted by the LINEST function. The closer this value is to 1, the better the fit.