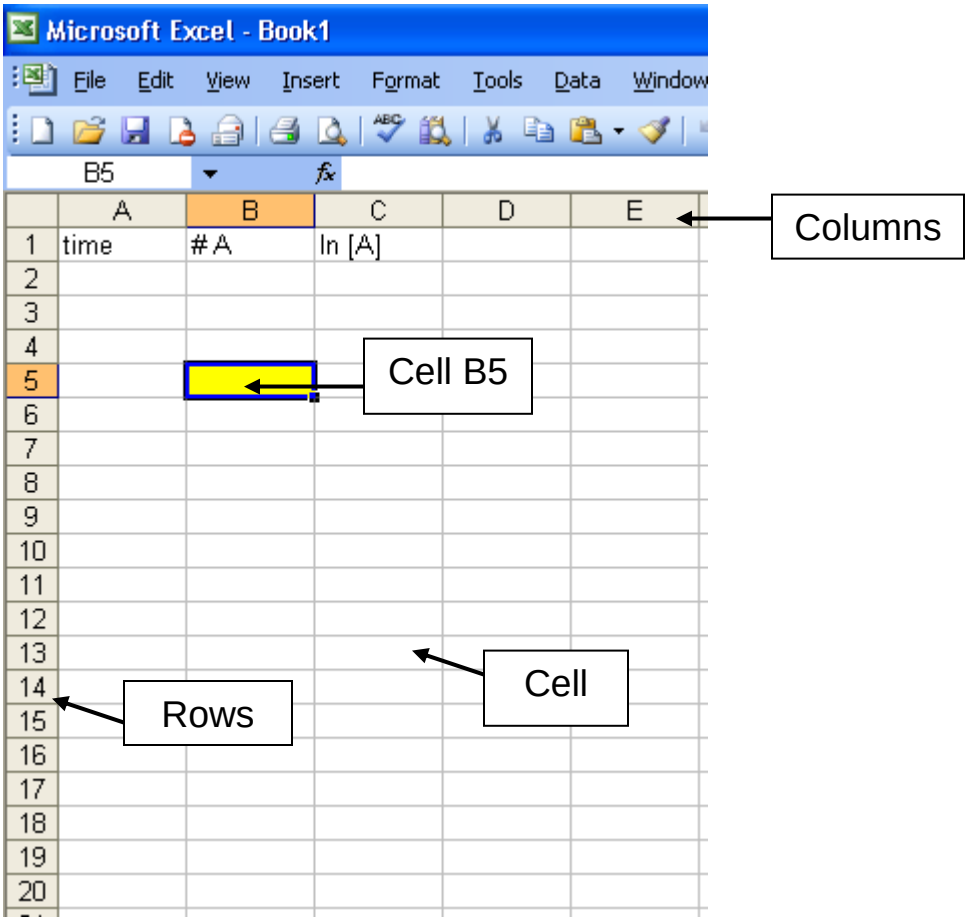
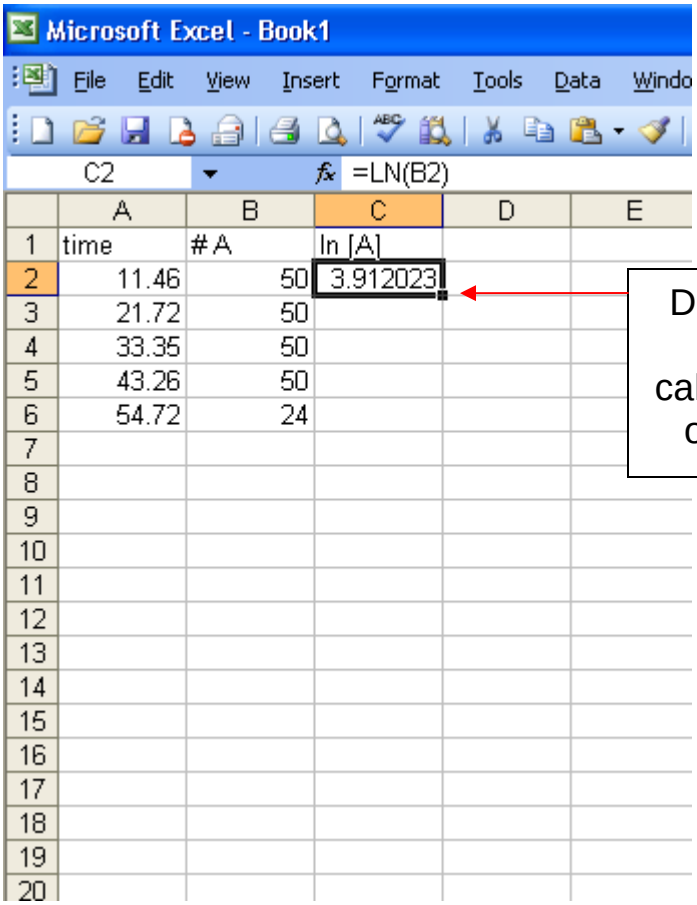
Appendix A: Excel 1997 – 2003 directions:

Finding rate coefficients:

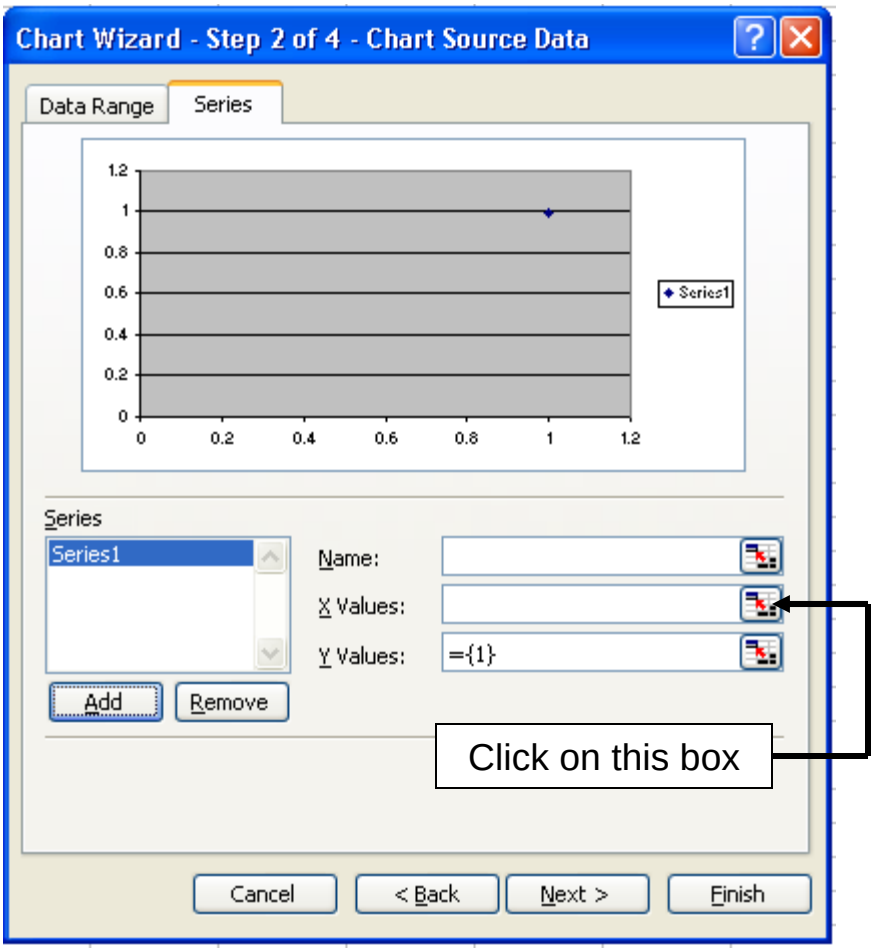
1) Label the first 3 columns the following: time, # A, and ln [A]. You can use the arrows on the keyboard to move around on the spreadsheet.
2) Each cell has a name starting with the column letter and ending with the row number, for example cell B5 which has been highlighted in the figure below.



3) Type in time data in the first column
4) Type in # of A in second column
5) Determine the ln [A] in the third column by typing in the following in **cell C2**: =, type in ln, hit an open parenthesis (, click on **cell B2**, hit an closed parenthesis), and hit enter. (**You must put in an equal sign in first or it will not calculate**.)
6) Click on **cell C2** and notice the black box in the lower right hand corner (**shown in the figure below**). **Double click** on the box and the rest of the column will be calculated or click once on the box and highlight the rest of the column.



7) To graph the ln [A] versus time data, first click on cell E4.
8) On the top of the screen notice that it reads file, edit, view, insert …. Click on insert.
9) Click on chart and a new menu will be on the screen
10) Under the chart type, located on the left-hand side of the menu, click on **XY (scatter)**.
11) On the bottom of the menu click on next
12) A new menu will be on the screen and on the top of the menu there will be two tabs labeled data range and series. Click on series.
13) Click on add located on the left-hand side of the menu.
14) On the right-hand side of the screen notice that it reads name:, x values, y values.
15) Notice that next to these names there is a space to type in data and then next to that there is a box with blue and red on it. (**Refer to the figure below**.) Click on that box that is next to x values.



16) Now the middle menu is gone and there is a small menu. Highlight the numbers only in the first column.
17) Click on the red and blue box again and the middle screen will come back.
18) Now following steps 15 – 17, do the same thing for y values. **Note**: Pick the box next to the y values and highlight the numbers in the 3rd column.
19) Click on next and under Value (X) axis: type in time (sec) and under Value (Y) axis: type in ln [A].
20) Click on next and then click on finish. Now the graph is on the spreadsheet.
21) Now we need to put a trendline on the graph, by left-clicking on one data point. (**This will turn all the data points yellow**.)
22) Right-click on one of the data points and click on **add trendline….**
23) Pick the linear regression line type
24) On the tabs located on the top of the menu, click on options
25) Click on the box next to display equation on chart
26) Hit ok and the equation will appear on the chart.
27) Now we need to format the equation, click on the equation
28) Right-click on the equation and click on format data labels…
29) Click on the tab labeled number on the new menu
30) Under category, located on the left-hand side of the menu, click on scientific

31) On the right-hand side of the screen, change the number of decimal places from 2 to 3 by highlighting the number and typing in 3 and then hit ok.
32) Record the slope value on your tutorial sheet.
33) To find the other rate coefficients, erase all numbers and start with step 3.

Finding the Activation Energy and Frequency Factor:

1) Label the first 2 columns the following: 1/T and ln k_f
2) Enter the 1/T data in the first column and ln k_f data in the second column.
3) Follow steps 7 – 14 from **finding rate coefficients**
4) On step 15 from **finding rate coefficients** enter 1/T for x and ln kf for y.
5) Follow steps 16 – 31 from **finding rate coefficients**
6) Record the slope and y – intercept values on your tutorial worksheet