

## Appendix III

# Using Excel to Graph Data

### *Data Tables*

- Open Microsoft Excel
- In order to make an accurate scatter plot insert the data you wish to appear on the x-axis (independent) in column A and input the second set of data (dependent) in column B so it will appear on the y-axis.
- Highlight cell A1 by clicking on it, and then insert a title for the data that will appear on the x-axis.
- Highlight cell B1 to insert a title for the data that will appear on the y-axis.
- Highlight cell A2 and insert your first data point then press enter to continue adding data to this column.
- Do the same for column B, highlight cell B2 and insert the data points for this column.

### *Formulas*

An “=” signifies to Excel that you will be entering a formula. You must start formulas with the “=” sign or else Excel will interpret your formula to be a label. For example, to calculate the log of a number you would enter “=log(B2)”, if your data was stored in cell B2. Use parentheses when necessary.

Cell addresses can be relative or specific

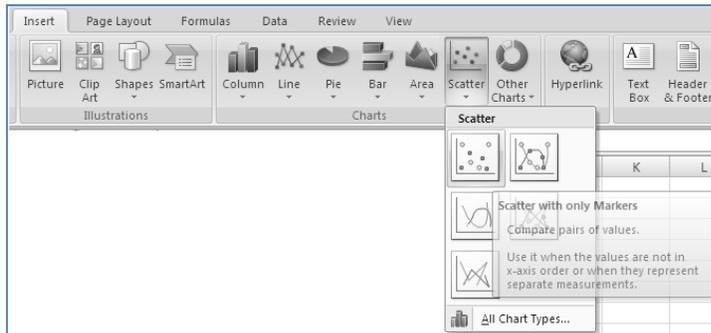
- **Specific Cell Addresses:** For a specific cell location include a \$ sign (\$B\$2). A formula containing this designation will always refer to cell B2 even when copied to a new location. If the \$ signs are left off, the label (B2) will be a relative label.
- **Relative Cell Addresses:** If you are in cell C2 writing the formula above to make a calculation, the number used in the formula will be the one in row 2 in the previous column (B2 for C2). If you copy that formula to another cell, say, D6, the number used will come from the relative cell location, C6 (same row, previous column).

### *Editing*

Copy and paste by highlighting the cells you want to copy. Do this by holding down the mouse button and dragging over the cells to copy. Select *Copy* from the *Edit* menu or use the keyboard shortcut (ctrl+c). Highlight the area where you want to paste and select *Paste* from the *Edit* menu (or ctrl+v). The paste area must be the same dimensions as the copied area. *Paste Special* found in the *Edit* menu allows you to paste the number displayed in that cell rather than the formula.

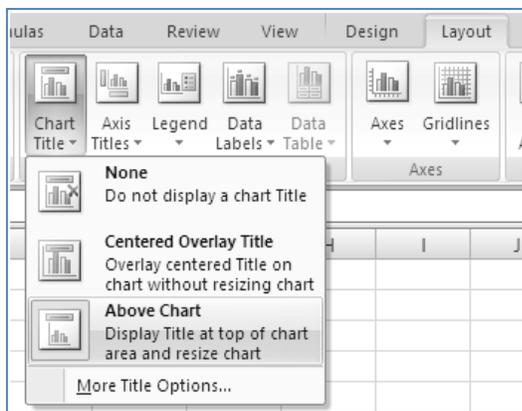
## Graphing

### Making a Scatter Plot of “x” as a Function of “y”:



**Figure 1:** Choosing a Scatter Plot

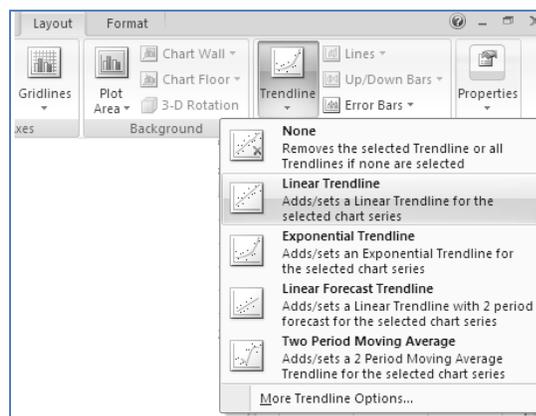
1. Highlight the data in the columns of interest (remember: data to appear on the x-axis should be in the first column).
2. Under the *Insert* tab select the *Scatter* option in the *Chart* section, then select the *Scatter with only Markers* (top left corner) option. (Figure 1)
3. Your graph should appear, click on the gridlines to highlight them and press delete to omit them from your graph (do the same for the legend).



**Figure 2:** Choosing “Above Chart” option.

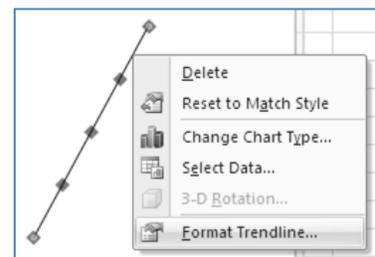
4. Under the *Layout* tab you will find a *Labels* section, select the *Chart Title* and *Axis Titles* options to add labels to your graph.
5. For the *Chart Title* choose the *Above Chart* option, a text box should appear on your graph. (Figure 2)
6. Single click in the text box, the cursor should appear and you can clear the text in order to enter your own title (do the same for your axes titles).
7. *Axis Titles*: select the *Title Below Axis* option under the *Primary Horizontal Axis Title* to label your x-axis, the select the *Rotated Title* option under the *Primary Vertical Axis Title* to label your y-axis.

### Determine the Linear Fit to the Data:



**Figure 3:** Choosing “Above Chart” option.

1. Under the *Layout* tab in the *Analysis* section select the *Trendline* option then select the *Linear Trendline* option, a line should appear on your graph. (Figure 3)
2. Highlight the trendline by clicking on it then right click the highlighted trendline. A list of options will appear, choose the *Format Trendline* option. (Figure 4)

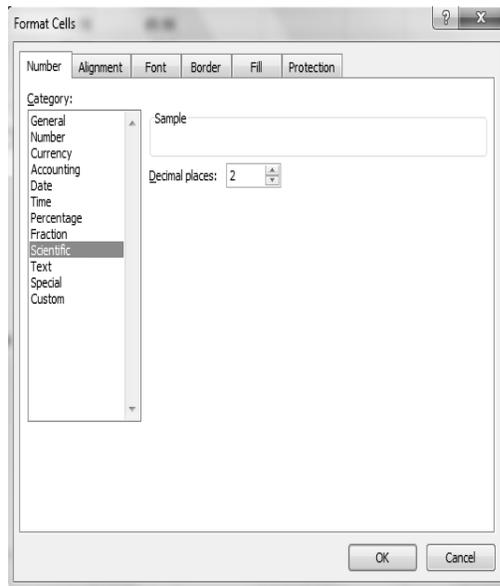


**Figure 4:** Format Trendline

3. A *Format Trendline* window will appear, choose the *Display Equation on chart* and *Display R-squared value on chart* options (near the bottom of window).

## Significant Figures

Once your data has been entered into an excel spreadsheet and you have determined the number of significant figures for your data, you can change how the digits are displayed.

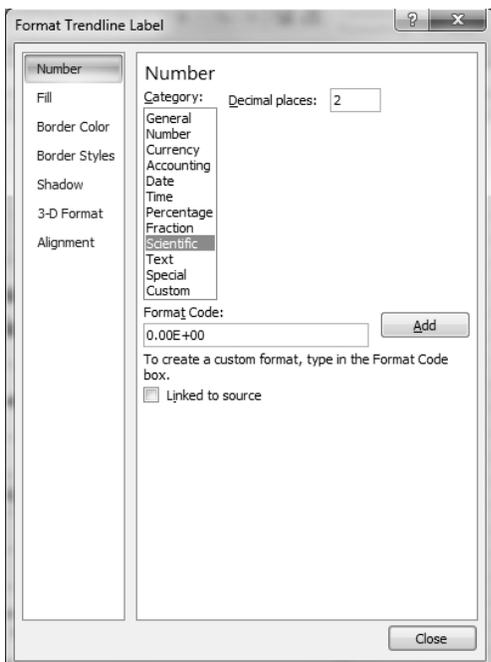


1. Select the cells you wish to format and right click. Under the selection box, towards the bottom, select the *Format Cells* option.
2. The window should open to the *Numbers* tab, if not select it from the options at the top of the box.
3. On the *Numbers* tab there will be a list of options on how to display your information (e.g. General, Number, Currency, etc...) you will want to select the *Scientific* option. Then adjust the up or down arrows to show how many significant figures are needed. (Figure 5)

**Figure 5:** Formatting Cells for Scientific Notation

## Editing a Trend Line to Include Scientific Notation

After producing a scatter plot, you will need to add a trendline and then format it to accommodate Scientific Notation.

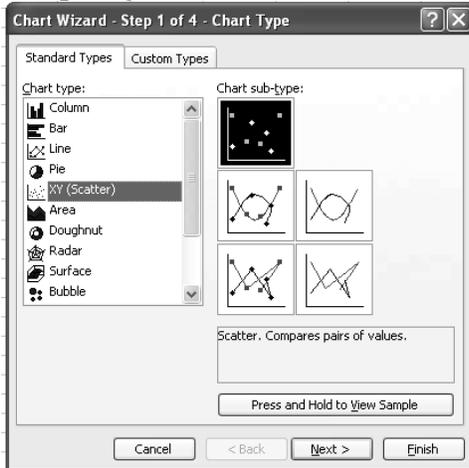


1. Adding a trendline to the data points on your scatter plot.
2. Right-click the a point that belongs to the data to which you want to add a trendline.
3. From the dialog box, select the *Add Trendline* option. The *Format Trendline* window will appear and towards the bottom there will be an option to *Display Equation on chart*, check this box as well as the *Display R-squared value on chart* box.
4. The equation might not be displaying proper scientific notation, to edit this right click the equation and select *Format Trendline Label*.
5. The box should open to the *Number* tab, and you will want to select the *Scientific* option under *Category*, then choose 2 decimal places.
6. Scientific notation is represented in Excel using an e, for example, 2.37e7 represents the number  $2.37 \times 10^7$ .

**Figure 6:** Formatting Trendline.

## Using Microsoft Office 2003

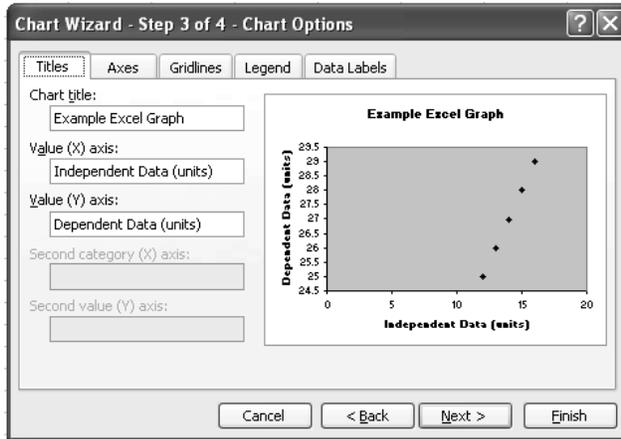
### Graphing



Making a scatter plot of x as a function of y:

- Highlight the data in the columns of interest (remember: data to appear on the x-axis should be in the first column).
- From the *Insert* menu select *Chart*.
- From *Chart Type* select *XY (Scatter)*, make sure that the *Scatter* option is highlighted under *Chart Sub-Type* then click the *Next* button. (Figure 7)

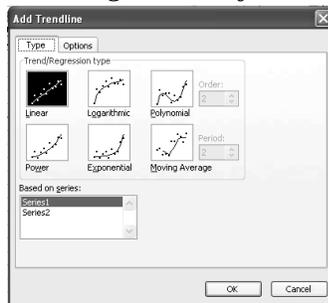
**Figure7:** 2003 Office Graphing of X-Y Scatter Plot



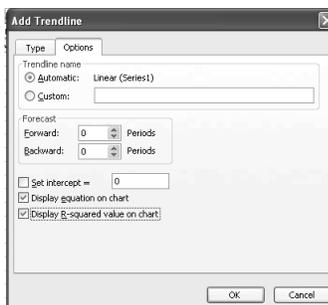
- Continue through the Chart Wizard creating labels for your axes and a title for your graph. Feel free to remove the gridlines and legend if they're not necessary. (Figure 8)
- When finished, the graph should appear in your spreadsheet.

**Figure 8:** 2003 Office Labeling of Graph Axes

### Creating a linear fit:



- Single-clicking the mouse on the chart (close the Chart Window).
- From the *Chart* menu select *Add Trendline*.
- Under the *Type* page select *Linear*. (Figure 9, to the left)



- Under the *Options* page click on *Display Equation on Chart*. (Figure 10, to the left)
  - Choose “Display Equation on Chart”
  - Choose “Display R-squared value on chart”