Appendix II: Summary for Making Spreadsheets and Graphs with Excel

1. a) Always begin an equation in Excel with an equal sign, “=”.  
   b) Division is indicated by the forward slash, “/”, as in “=27/3”, where the answer would be 9.  
   c) Multiplication is indicated by “*” as in “=8*5”, where the answer would be 40. 
   d) Use cell designations whenever possible, rather than typing in a number.
   e) Use parentheses to make sure the operations are performed in the correct order. Without parenthesis, the computer will perform any multiplication or division before any addition or subtraction. (Order of operations!) 
   f) The cell in which you type an equation should show a numerical answer, but when you look in the active bar (the bar next to the fx), it will show the equation you entered. As a formula-writing example, assume you have an experimental value in cell, M1, and a true (or theoretical) value in cell, M2. To determine the difference between the two values, you would enter “=M1-M2”. To determine the % error of the experimental value, you would type “=(M1-M2)/M2*100”. Do not add units.

2. a) In Excel there are many built in formulas that can be pasted into a cell such as =AVERAGE( ). This calculates the average of the set of numbers that are indicated by their cell designation in the parentheses ( ). 
   b) If you always want a number or the answer to an equation to be positive (i.e. take the absolute value), put that number or equation inside parentheses in the following” =ABS( )”. 
   c) Another useful function is standard deviation, designated by =STDEV( ).
   d) To use these functions, you can either type in the command or you can click on the fx icon on the lowest bar above the spreadsheet. The pop-up menu will show you the built-in formulas available. Either way, it is easy to put the appropriate cell designations inside the parentheses by highlighting the data.

3. When you want to calculate the same thing many times, you can copy-down (fill-down) or copy-right (fill-right), by selecting the cell containing the formula you want to repeat, putting your cursor on the lower right hand corner and dragging down or to the right.

4. The appearance of #### in a cell means the column is to narrow. Widen the column or reduce the number of digits in the number.

5. To change the column width take the cursor and place it on the bar on the right side of the column at the top of the spreadsheet. When the cursor is in the appropriate location to change cell width, it will change it from the white cross to a short vertical black bar crossing a horizontal bidirectional arrow. Click and drag to the right to increase the width of the column, or drag left to decrease the width of the column.

6. To set the number of places displayed, right-click on the cell, and when the menu box opens, click Format Cells, go to the Number tab, and select Number from the Category list, 1 from the Decimal places list, and then click OK. The “1” here means that one place after the decimal point will be displayed. You can also vary the number of decimal places shown by clicking one of the two boxes in the numbers section of the tool bar (Each button has a small blue arrow).

7. Making a scatter graph. Click on “Insert” tab at the top left of the page to access the tool bar with graph options. Place the cursor over the Scatter icon on the toolbar. Click “scatter graph”, then click the upper left hand box (Scatter with no lines) in the menu box that opens. A Chart box will appear in the middle of the screen. Right click in the Chart Area box then click “Select Data”. When the Select Data Source box opens, click on “Add” (under the Legend Entries Series). A new box (Edit Series) will appear. See right. Click on the icon with the red diagonal arrow to the right of the Series X values box, navigate to the spreadsheet, and select the cells for the x-axis by doing a click and drag. Then click on the icon with the downward pointing red arrow in the Edit Series box (shown
right) and repeat the procedure for the Y axis, selecting cells for the y-axis. To add an additional series, again right-click in the Chart Area box, then click “Select Data”, and “Add”, and proceed as above.
To add a chart title (include your name at the end of the title), axis labels, etc., click “Layout” on the toolbar (underneath Chart Tools), and proceed accordingly.
To obtain a trendline, under “Layout” (click on graph to make this tab appear), click on the “Trendline” icon on the toolbar, then click more “Trendline Options”, then click “Display Equation” and “Display R-squared.” Change your trendline equation so that the slope has appropriate significant figures by right-clicking on the trendline equation, selecting “Format Trendline Label” and choosing scientific and two decimal places.

8. **Formula Page.** You can show a formula page two ways. 1. Select the “Formula tab” and choose “Show Formulas” (top of formula auditing area), or 2. Press the “Ctrl” button and “~” buttons simultaneously.

9. **Printing a spreadsheet, formula page or graph** Go to “Print Preview”, then “Page Setup”, and a box with tabs will appear.
On the “Page” tab, choose either “Portrait” or “Landscape” for the orientation based on how the data is laid out, and “Fit to 1 page wide by 1 page tall”.
On the “Margins” tab, lower the left and right margins to 0.5.
For the spreadsheet and formula page, also click on the “Sheet” tab, and under “Print”, make sure that “Row and Column Headings” are checked.
On the formula page, remember to adjust the width of each column. On the formula page, it is alright if some of the writing does not show completely as long as all of the formulas show completely.