Using Excel for Graphing and Data Analysis

Modern computer tools such as spreadsheets make it easy to analyze data, determining not just that there is a connection between two variables, but also what the mathematical relationship is. For example, it is easy to graph the volume of a cylinder vs. its diameter, but it is harder to find out that $V=2\pi r^2 h$.

Here is some general guidance on entering, graphing, and analyzing data.

1. Before you even enter data and formulas, save your spreadsheet to your own drive, using a logical name which will tell you and your teacher what the assignment was. (There is no point to having a dozen different spreadsheets all with a useless title such as "lab".)
2. Enter data using column headings which include units. Do not include anything other than a number in the actual data cells. (For example, in the "height (cm)" column, enter 172, not 172 cm.) Excel can not do calculations with anything other than numbers.
3. Let the computer do the work! Notice that in the diagram below, the formula entered for average time tells the computer to add up the values in the previous three columns, and divide by three to get the average. You should never have to type a number twice. Just click on the cell, and its name (C3, for example) will appear in the formula. Excel then does the calculation with whatever number is in that cell.

B	C	D	E	F
Length (cm)	time 1 (s)	time 2 (s)	time 3 (s)	Avg time (s)
24	1.82	1.9	1.87	=(C3+D3+E3)/3
32	2.45	2.47	2.39	
45	2.91	3.02	2.99	

4. To graph, select the data for the x and y axes of the graph. Be sure to include the headers, and an equal number of cells for x and y data. You may need to hold down the Control key to select the second set of numbers if the data columns are not adjacent. An x-y scatter plot will usually give the most useful results. Enter the titles, turn on some gridlines, and experiment to learn about all the adjustments you can make to the graph. Do not bother playing with color, because when you print it out, it will usually be in black and white.
5. Once the data is graphed, you can find useful features by right-clicking on various areas. To add a best-fit curve (a "trendline"), right click on a data point. You can also go to trendline options, and display the mathematical equation for the trendline. It will be displayed in the form y = f(x), but you will need to rewrite it on your lab, filling in what y and x actually represented (time, speed, mass, length^2, etc.).
6. If the variables have a linear relationship, you can use Algebra 1 skills to determine the slope and intercept, and the equation of the line. If the data do not have a linear relationship, you can experiment by making new columns in which you can experiment with different exponents. For example, instead of graphing braking distance vs. speed, you can try graphing braking distance vs. speed squared.
7. Once your graph looks nice, has logical titles and labels, has useful gridlines and trendlines, and is checked for spelling, you can copy it and paste it, and the original data table, into your lab report. Right click on them to select the "Square" layout, which will allow you to move the graphs and charts around as you wish.