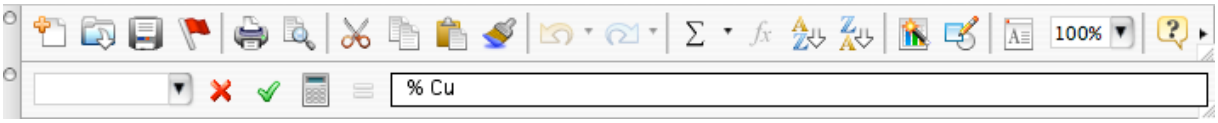
Excel Primer

To Start Excel : Double click on the Excel icon or select the program from the menu (often found under Recent Applications). A blank workbook page should appear containing a grid of cells with letters labeling columns and numbers labeling rows. If you don't have a blank Excel sheet you can obtain one by selecting **File** from the uppermost menu, and then **New.** On newer versions of Excel you will first open the **Project Gallery** and then open the **Excel Workbook.**

To Enter Numbers and/or text: Click in the cell that you wish to type in. Enter numbers or text headings as desired. You can type in the formula bar:

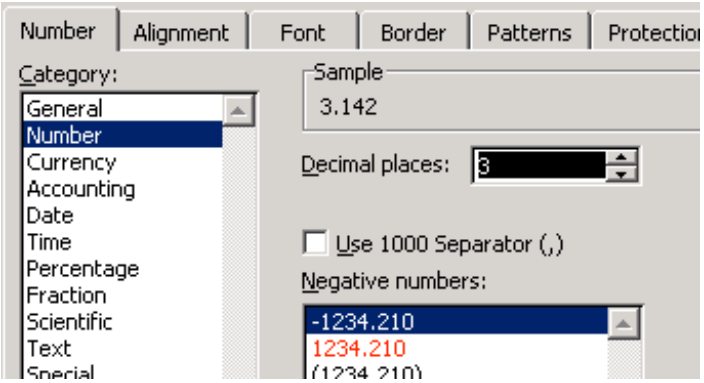


or you can type directly into the target cell. To enter your new information, click on the green √ or press the Enter key. If you change your mind and you want to leave the contents of the cell unchanged after you have started typing, just press the red X button. Your new text will be discarded.

Formatting of cells can be accomplished by highlighting the cells you wish to have the formatting apply to and selecting the desired formatting option. This option can be selected on the toolbar (for example, **B** stands for bold, click on it to choose it) or by pulling down the **Format** menu and choosing **Cells…**. In particular, you can change the number of significant figures displayed. For example, type "=PI()" into a cell just to get an example number. The result will be shown as

3.14159265

Now, highlight the cell, pull down the **Format** menu and choose **Cells…**. Click on the **Number** tab and the "Number" category. Change the number of decimal points to the desired number:



If you choose 3 decimal places the PI cell will now appear as:

3.142

You can also use the "Scientific" category to force the results to be listed in scientific notation.

To Enter Formulas in Excel: To have Excel do a calculation for you, type the appropriate formula in the cell you wish the desired answer to appear, starting with an "=" sign.

Examples: a) to add the number in cell B1 to the value in cell E7 and have this sum appear in cell G22, type "**=B1+E7**" in cell G22, then press the **Enter** key.

b) to multiply the number in A5 by that in B5 and subtract 10,and have the value appear in C5, type "= (**(A5*B5) –10)**"in cell C5, and then press the **Enter** key

{{ Note that division is denoted by a backslash "/" and multiplication is denoted by "*"}}

c) to calculate the average, median, and standard deviation for the numbers in cells D3 to D22 type =AVERAGE(D3:D22), =MEDIAN(D3:D22), and =STDEV(D3:D22), respectively in the cells you wish these values to appear. Note that the colon specifies a range of cells.

Another way to implement these and many other functions is to use the Function Wizard icon at the top of your screen (denoted by "***fx***"). Click on the cell in which you want the final answer to appear. Now click the ***fx*** icon. Select the function desired such as AVERAGE for average. The prompt will ask you for what range of cells do you want the average. You have two options at this point; one is to reply to the prompt by entering the beginning and end of the range (for example C2:C55), the second option is to highlight the cells desired to be included using the mouse. This is a time saver when you have a lot of data to manipulate.

<u>Repeating Calculations: Filling cells down or across</u>: Now we get to the real power of spreadsheet applications. As an example lets make an interest table for a bank. Assume the interest rate is 5.4% and we want to calculate the yearly interest for a range of deposits. If the first deposit is in cell C3, the interest can be calculated by the formula =5.4*C3/100:

deposit	interest
2000	=5.4*C3/100

We can now easily repeat this calculation with automatic row filling. So start by entering new values for the deposit is successive rows, then highlight the formula cell you entered above:

deposit	interest
2000	108
3000	
4000	
5000	

special fill handle

Click on the special fill handle and drag down to the row with your last deposit value. The calculation will now be automatically filled in for you:

deposit	interest
2000	108
3000	162
4000	216
5000	270

Notice the formulas that have be entered automatically for you:

deposit	interest
2000	=5.4*C3/100
3000	=5.4*C4/100
4000	=5.4*C5/100
5000	=5.4*C6/100

Excel is smart enough to change the cell address to reflect the different deposit values for you automatically. This mode is called relative addressing. You can fill formulas down rows or across columns. This ability is the real time saving advantage of using a spreadsheet program.

Relative verses Absolute Cell Addresses: Row filling is very handy, except there are times when you don't want Excel to automatically adjust the cell references in your formulas. Lets look at a specific example. The interest calculation above is a good example. Note that we put the interest rate directly into the formula. However, the interest rate at banks changes from day-to-day. It would be better to put the interest rate into a cell so that you can change just the one cell when the interest rate changes:

interest rate=	5.4	deposit	interest
		2000	=B2*C3/100
		3000	
		4000	
		5000	

However, if you try to fill this formula down, for the next row Excel will change the formula to =B3*C4/100 (try it). Of course the interest rate is still in cell B2. To tell Excel not to change the cell reference put $ signs in front of the column and row:

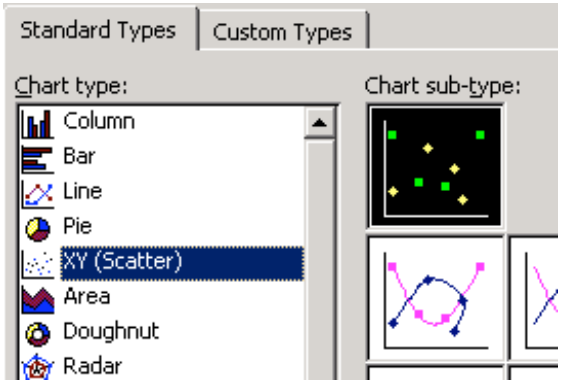
interest rate=	5.4	deposit	interest
		2000	=$B$2*C3/100
		3000	
		4000	
		5000	

Now filling this formula down will give the proper result:

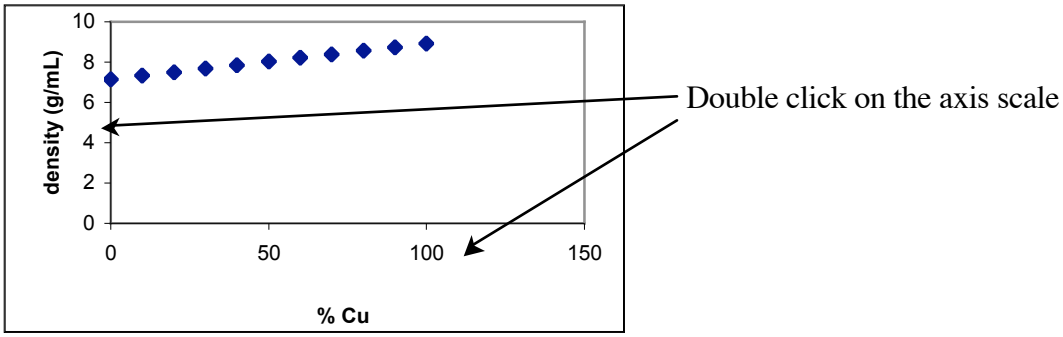
interest rate=	5.4	deposit	interest
		2000	=$B$2*C3/100
		3000	=$B$2*C4/100
		4000	=$B$2*C5/100
		5000	=$B$2*C6/100

Making a Graph: Highlight the data you wish to plot (which should be in adjacent columns). Then select Chart from the Insert menu (or use the Chart Wizard icon from the toolbar–it looks like a 3-dimensional bar graph). Choose the appropriate options in each window. Since you can go back, don't be afraid to try different options to see what they do to familiarize yourself with the different features. However, it is prudent to only change one major option at a time to see what that feature

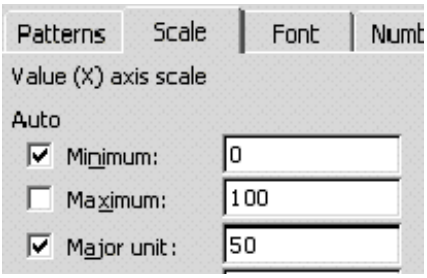
does and to make it easy to remember what to change back if necessary. For your labs this semester you will use **XY scatter** type of plots. It is usually best to choose the sub-type that does not connect the dots. (We will add a trendline later to approximate the data):

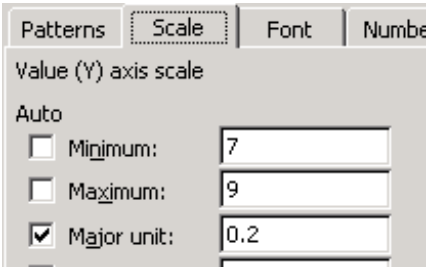


It is often necessary to adjust the scale of the axes. You should have the data fill the plot area. For example for the plot:



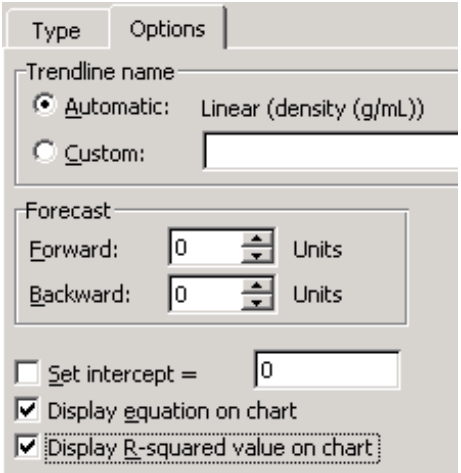
Double click on the axis scale that you want to change. For example for the x-axis changing the Maximum to 100 is appropriate for x-values as percentages:



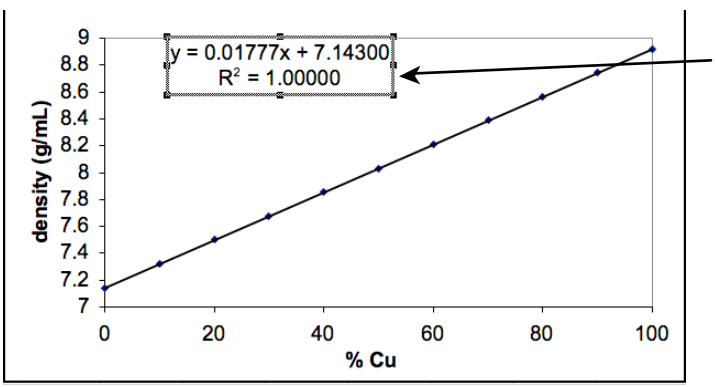


Also changing the y-axis scale is necessary in this case to see the data better.

<u>Linear Regression</u>: Once you have made a graph you will often want to determine the best-fit equation of the line and the correlation coefficient (this is R^2 and indicates how well the data fit the line). From the top tool bar pull down the **Chart menu**and choose **Add Trendline**. Choose the linear regression type. Click on the tab marked "**options**" and select both the "**Display equation on chart**" and the "**Display the R-squared value on chart**":



Once you click **OK**, the graph will display the equation of the line as well as the R^2 value. You can drag the linear regression results to a convenient spot. Often the number of significant figures in the slope and intercept are too few. To change the number of significant figures in the regression results, click on the linear regression results, so that they are highlighted as shown below:



Click to highlight the regression results

Now pull down the **Format** menu and choose **Selected Data Labels**. Switch to the **Number** tab and change the number formatting as described above.

There is nothing wrong with adding labels to your graphs with pen after you have printed your chart. For example, students often forget to include the units for the axes labels. The axes should always include the appropriate labels. Don't bother to edit the graph and reprint it; save paper. Just add your additions in black pen.

The x and y values for a plot don't need to be in adjacent columns. Select just the x values first and then hold down the Control key and select the y values.

% Cu (g/g)	V (mL)	density (g/mL)
0	22.343	7.143
10	22.520725	7.320725
20	22.69845	7.49845
30	22.876175	7.676175

Hold down the Control key while selecting the y-column

You can add data to a chart already placed in Excel by selecting the data you wish to add, copying it, and pasting it after selecting the appropriate chart. To add a second independent xy plot to an existing one, highlight and copy the new column, select the cart, select **Paste Special** from the Edit menu, and check the box for **Categories (x values) in the First Column**, **New Series**, and **Values (Y) in Columns**. To delete a chart, select the chart and from the **Edit** menu, slide right on **Clear,** and choose **All**.

Help

There are also extensive explanations available within Excel. Select Microsoft Excel Help in the Help menu or click on the question mark on the top right of the ruler to access this. In addition, some basic Excel instructions are found in the Information Technology Services section of the Colby web site (www.colby.edu/info.tech/howtos under the Microsoft Office category select Excel: Basic Instructions).