

Further Adventures in Excel 2007

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Part II: Further Adventures in Excel 2007

Type or copy and paste the following information into Excel 2007 as it is written here. Save the file as Atomic mass. Place it in the Chemistry folder that you already created in the first tutorial.

6.02E+23	1.0079
0.082057	4.0026
8.3144	6.941
	9.01218
	10.81
	12.011
	14.0067
	15.9994
	18.9984
	20.179

EXERCISE 1: Block Copy

Take the column A of constants and highlight them. Go to the toolbar and find the copy button. It is above **Clipboard** on the far left and looks like two pieces of paper. **SELECT** the **Copy** button and move the cursor into column C1. Find the **Paste** button (it looks like a clipboard with a piece of paper) and paste the information from column A to Column C. Check to make sure it matches the information in column A, then delete column A. Step by step and picture Process below.

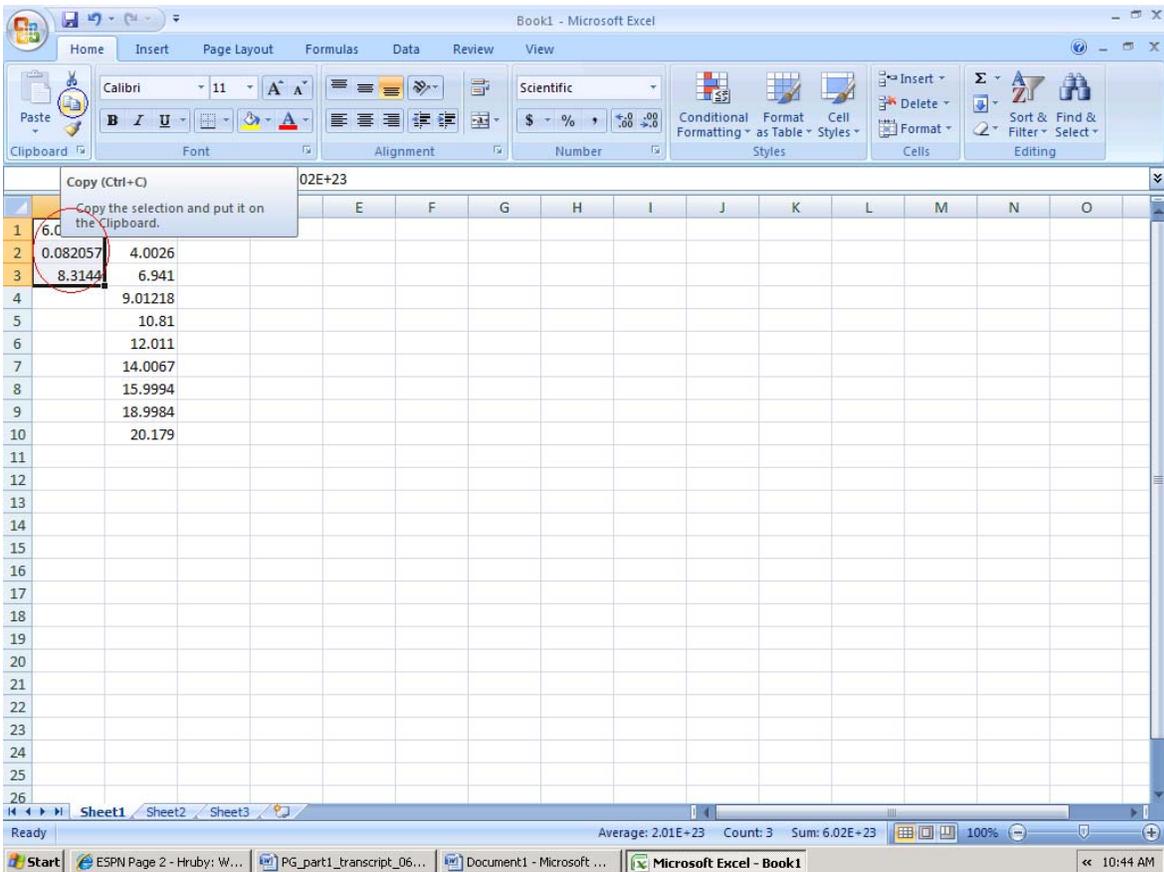


Figure 1: Before Pasting

- (1) Highlight column A by SELECTING the A label for the column.
- (2) Hit Ctrl-C or the Copy icon on the button bar. The Copy icon looks like two overlapping pages.
- (3) Highlight column C by SELECTING the C label for the column.
- (4) Hit Ctrl-V or the Paste icon on the button bar. The Paste icon looks like a clipboard with a piece of paper.
- (5) Note that the entire A1:A3 block of data is still there.
- (6) You may get "#####" in the cell in Row 1. This is because the complete number is wider than the format of the cell. If you look at the "fx" box above the spreadsheet, you will see that the number is still in the cell. You can quickly expand the cell width by SELECTING column C, and then double-clicking on the line between columns C and D. Now you will see the complete number in cell C1.

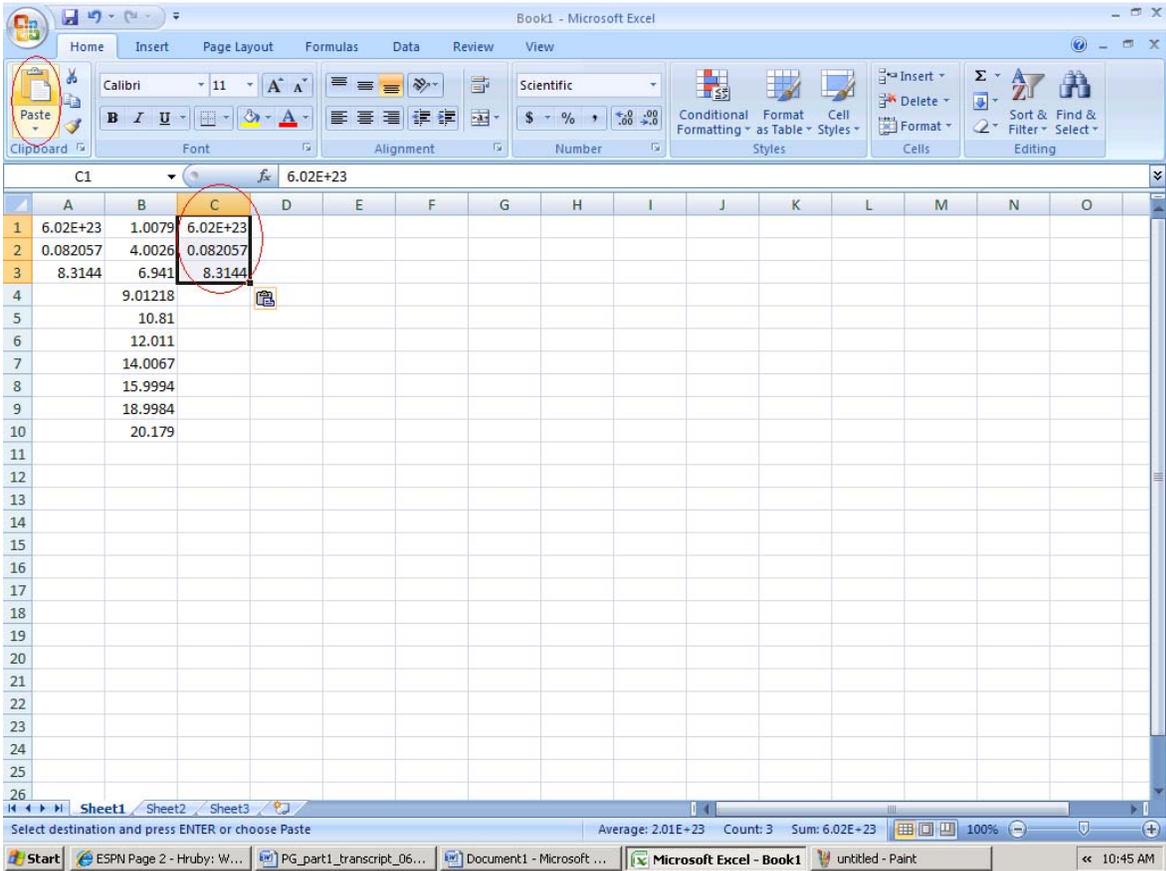


Figure 2: After pasting

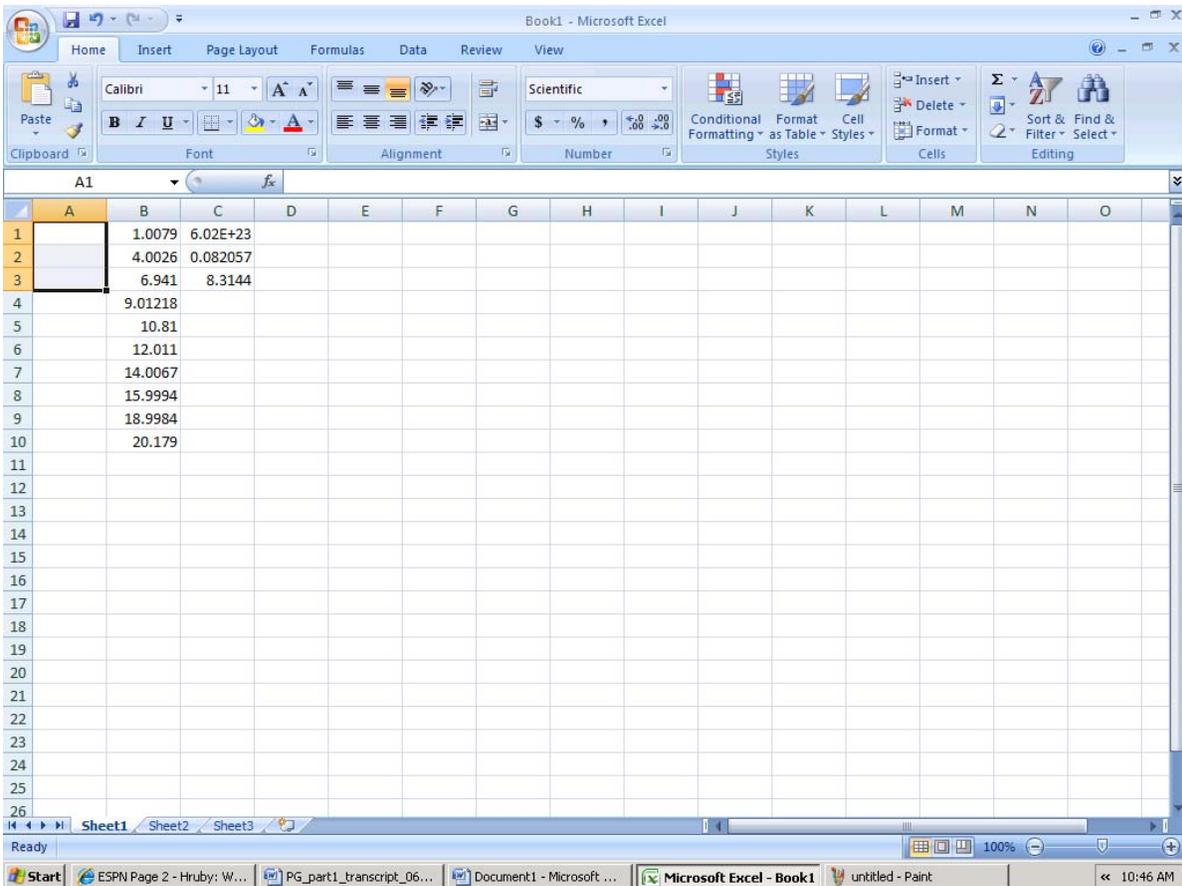


Figure 3: After deleting

EXERCISE 2: Inserting a Row and a Column

We would like to place a label on the top of the data that is now in Column B. We would also like to place the atomic number next to the atomic masses. If we add a row, we can place the labels in the Row 1. We would also like to define our constants. We can do this by adding a column between B and C.

- Highlight Row 1 by **SELECTING 1** along the far left edge of the screen.
- From Tool bar **SELECT Home**, then from the **Cells** menu, **Insert**. As one row is highlighted, it “knows” to only insert one row.
- Highlight Column C,
- Again, from the **Cells** menu, **Insert**.

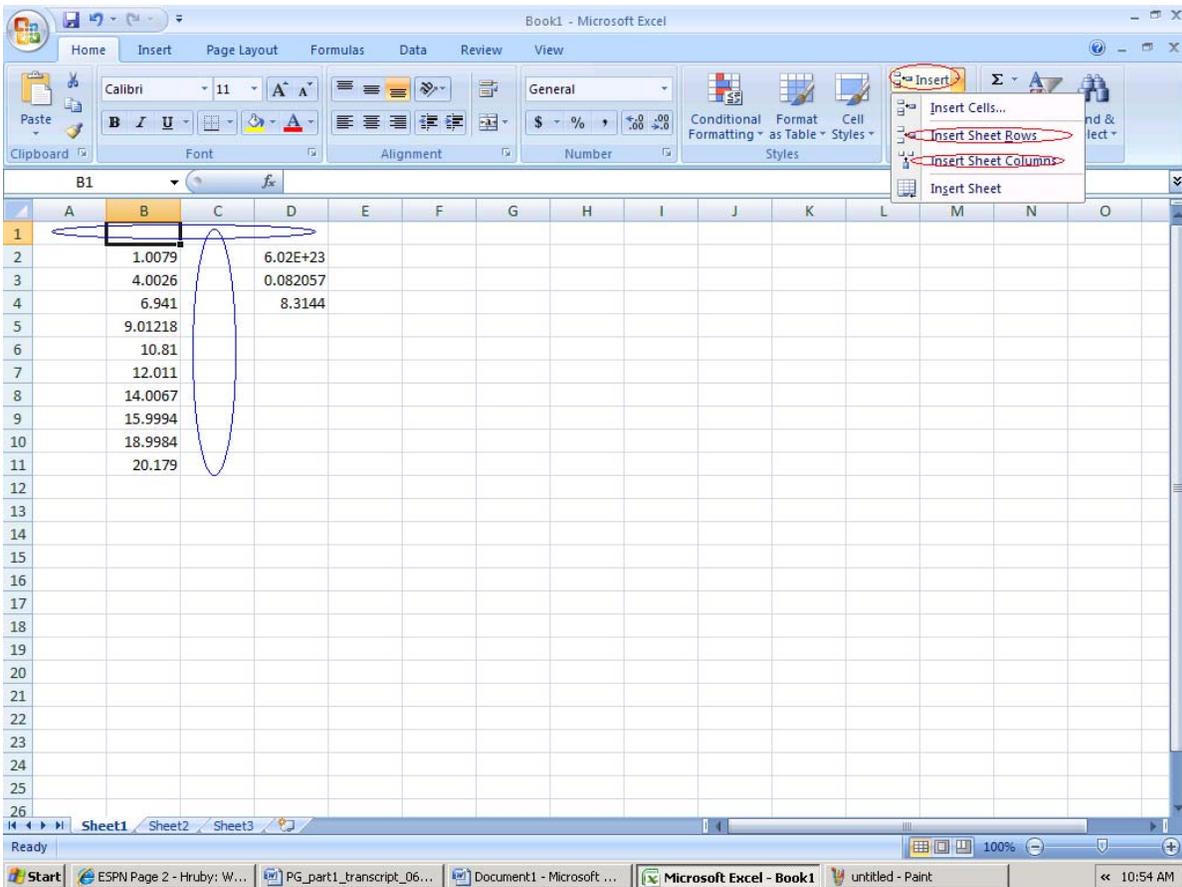


Figure 4: After inserting a row and a column

(e) Enter the labels **Atomic Number** into A1 and **Atomic Mass** into B1. Also enter the **Constant names** in column C, and finally **Constant values** in column D. Type in the names of the constants into cells C2..C4 as shown on picture below.

(f) Atomic Mass in cell B1 overlaps Atomic Number in A1. Highlight cells A1:B1. SELECT Under the **Cells** menu, **Format** then **Autofit Column Width**. It will size the columns to fit the size of the labels or numeric format in the cells. The final result will look something like the image below with cell B1 still highlighted.

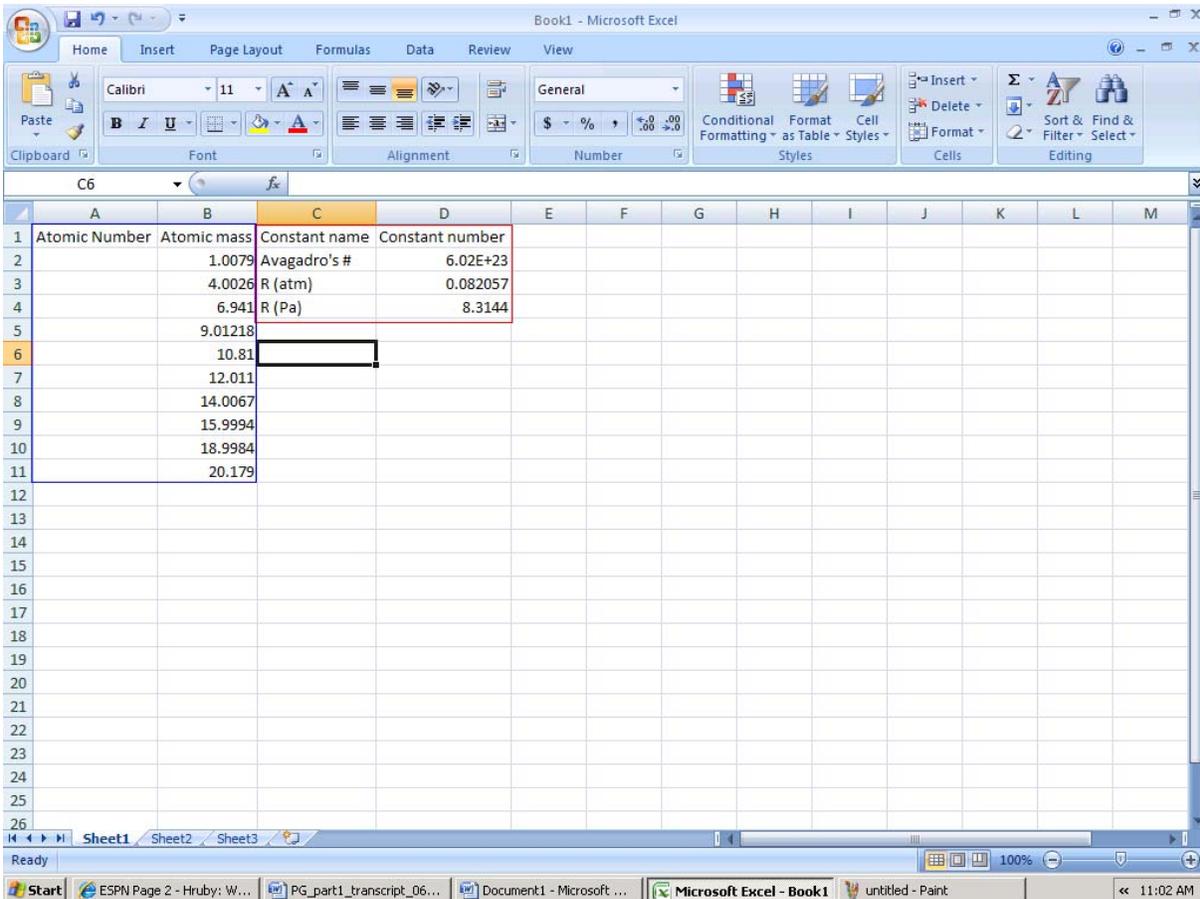


Figure 5: Finished with Exercise 2

EXERCISE 3: Formulas

- Place the number 1 into cell A2.
- Place the formula $=A2+1$ into cell A3. You might wonder why you have to have a leading = sign for the formula $=A2+1$. When you enter the formula in, the leading the = indicates that the result is a value. Thus, $=A2+1$ is a formula that results in a value whereas $A2+1$ (with no leading =) is a label. A number alone is always a value, so they need no leading =.
- The result of the formula should be the value 2.

We are going to copy the cell A3 to the range A4:A11. Hopefully, the utility of this action will become apparent.

- Highlight A3.

(e) In the Clipboard menu, **SELECT Copy**.

(f) Highlight the block A4:A11.

(g) **SELECT Paste**. The result should look somewhat like the image below.

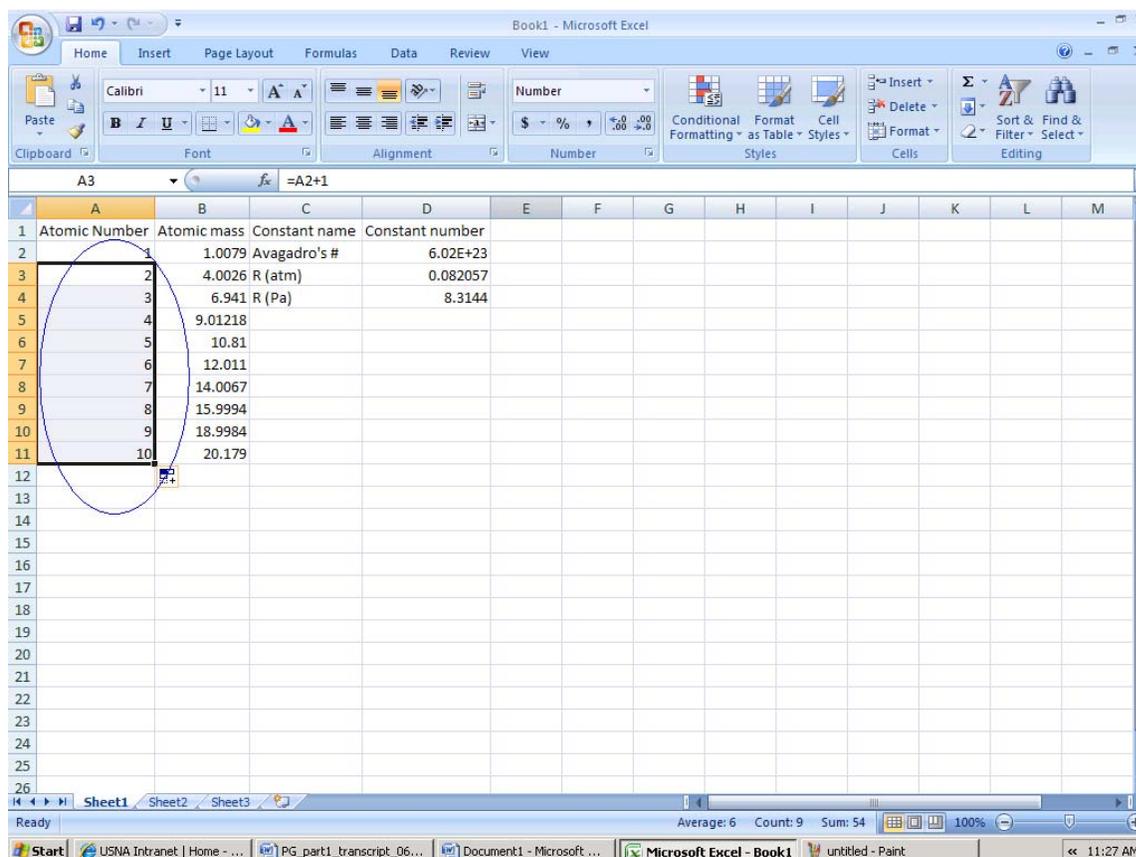


Figure 6: Atomic Numbers as result of formulas

You will notice that the values in A4:A11 increases by one as you go down from cell to cell. Look to the Editing line (to the right of the cell address and hand). Now arrow down through the cells. You will notice that the formula is changing. As you move to increasing row number, the row number in the formula increments up. This is the beauty of spreadsheets. A simple repetitive computation can be done in a snap.

EXERCISE 4: Addresses

For the next task, compute the mass of a single atom of each element. As with any problem you must first decide how to solve the problem then apply the power of the spreadsheet. You should be able to work this but here is the answer just in case. The mass of a single atom of an element is simply the atomic mass divided by Avogadro's number. For your convenience, Avogadro's number should be found in cell D2.

Let's put the results into a new column next to the atomic masses. Insert a column next to

column B. This is now column C and your constants should be in column D and column E. Note that Avogadro's # is now in E2.

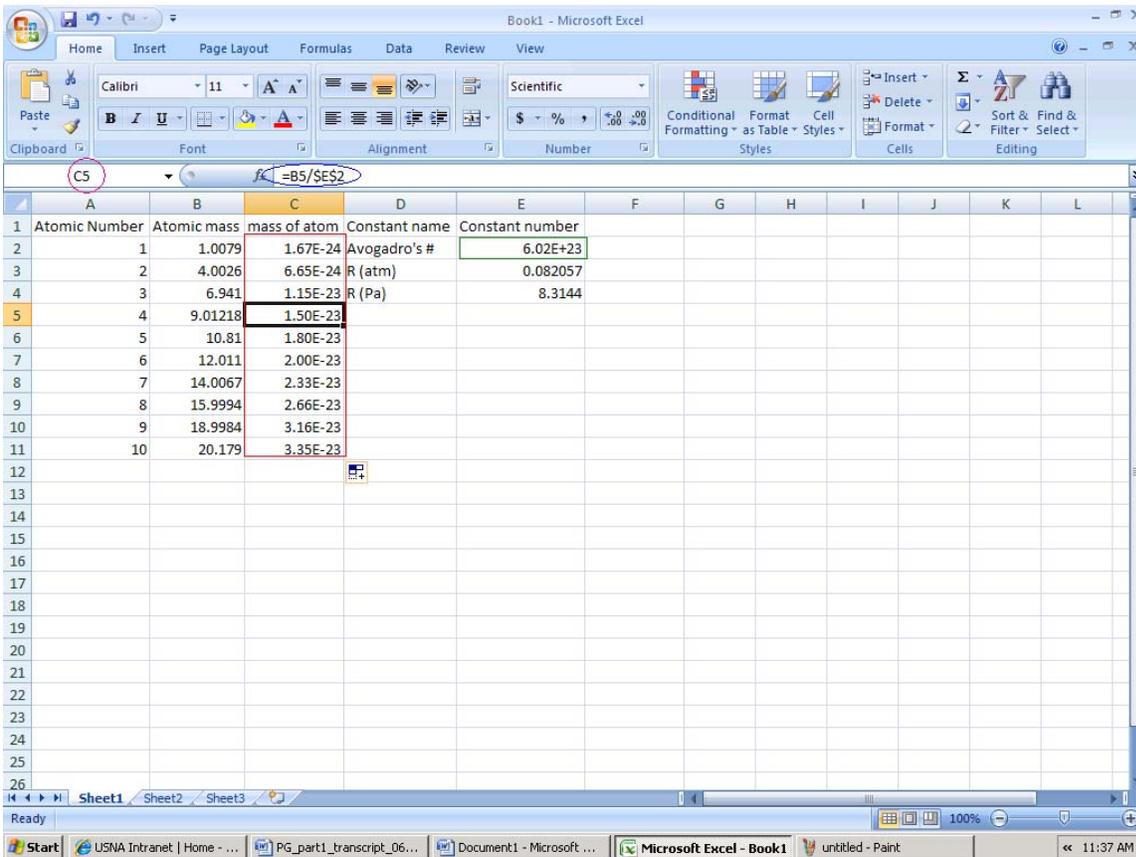
(a) Place the label **Mass Of An Atom** into cell C1.

(b) Place the formula **=B2/\$E\$2** into cell C2 (see image below). Note: when you enter the Formula into the Cell, the Cell displays the value corresponding to the operation (1.67E-24) while the text line above, still shows the Formula.

(c) Your value may not read "1.67E-24"; it may read "1.67409E-24" or it may read "0". This is because the format for the display of the number is set to some default. To get your format to match the figure below, select the column and right-click. Go to the "Number Tab" and SELECT **Scientific**. Now fill in the number of places after the decimal, in this case **2**.

The cell **B2** is referred to as a Relative Address. It will change like the addresses in column A. It is useful when you are using a series of numbers that will have repetitious calculations done on them. The \$ notation in **\$E\$2** indicates an absolute address. In all of the calculations we will want to use the same value of Avogadro's Number. We do not want to have to put in 10 copies of this number, so we specify that the address does not increment as we copy it down to other cells. Both the Column E and the Row 2 are specified (though in this particular case, only the row need have been specified). You will use an absolute address for any constant value that you need.

(d) Now copy the formula in cell C2 into cells C3:C11. The answers should range from 1.67E-24 to 3.35E-23.



EXERCISE 5: @ Functions

We are going to perform three statistical functions on this data. One will give us an answer we expect, one will give us an answer we could estimate and one will give us an answer we could not easily calculate.

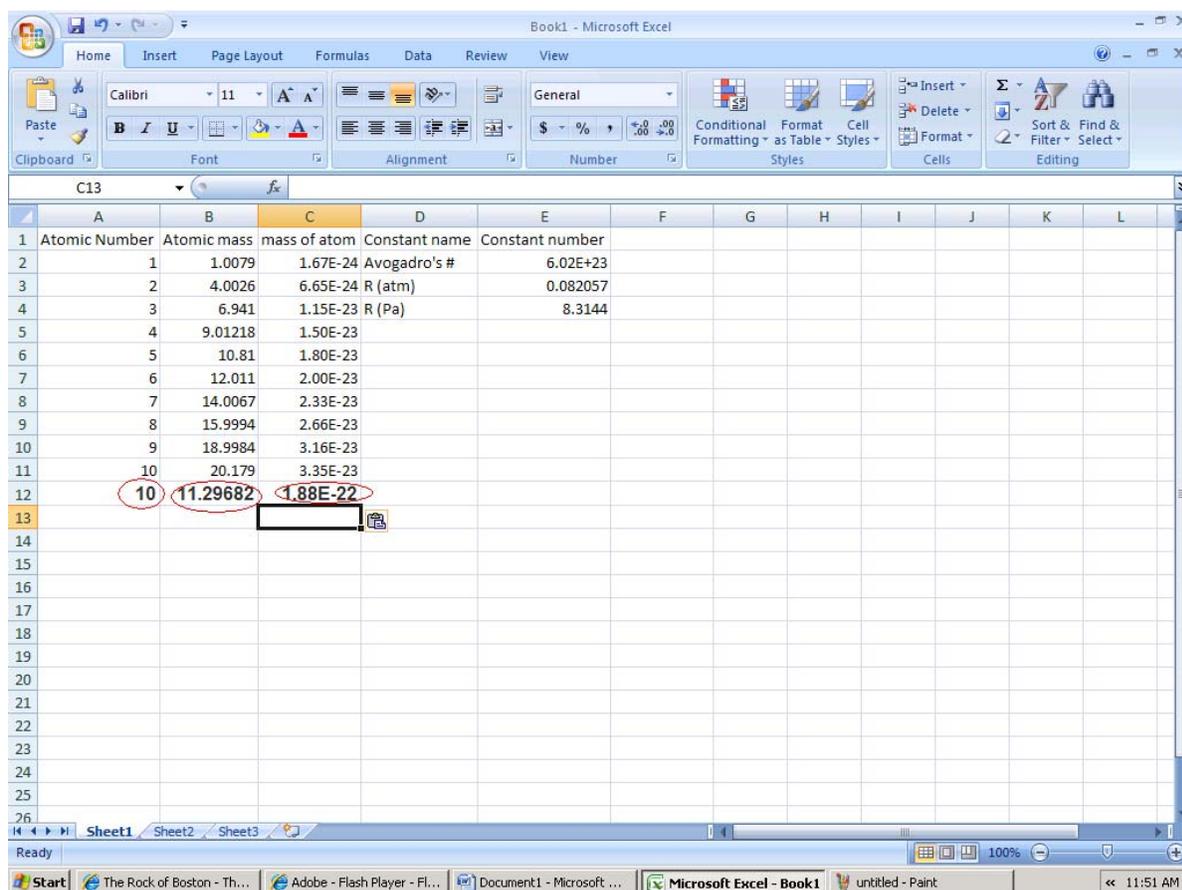
Excel has a large number of canned programs. These programs also start with the symbol =. If, after an = symbol, the program recognizes text that is not part of a cell address, it will check to see if the text corresponds to a canned program. Some perform mathematical functions such as **sin**, **cos**, **log** and **ln** (for the mathematical functions: sine, cosine, logarithm, and natural logarithm). Others perform sophisticated financial functions such as compound interest and mortgage principle and interest. The ones we will be using are relatively simple statistical functions of **count**, **average** and **sum**.

(a) In grade school a common exercise is to count the number of pages in a book. Most of the 4th graders wildly count the pages one-by-one. A few know the trick and look at the last page of the book and read off the number. We know to look at the last value in the list, but we are going to allow Excel to be an incredibly efficient 4th grader and count each element, one-by-one. Move to cell A12. Type into the cell **=count(A2:A11)** and hit the Enter key. The = - sign at the beginning and the parentheses tell the program that this is a function and it should be performed on whatever is in the parentheses, in this case a range of cells. You should get the value **10** showing in the cell (see below). If you want to see how it works in other columns, you could copy that cell into B12..C12. Again, you would find **10** in cells B12

and C12, but you would find **0** in F12.

(b) If you took the average (mean) of the atomic masses, you would expect it to be a value around or a little above the mean of the masses of elements 5 and 6 (about 11 amu). Let's test this. In cell B12, type **=average(B2:B11)** and hit the Enter key. You will note that when you type **A-V-E, etc...**, the program guesses what function you may wish. Instead of typing out **A-V-E-R-A-G-E**, you can select the function from the list below and it automatically gives you an open parenthesis. You can type in the range of cells or you can highlight the range. Finally, give a close parenthesis and **Enter**.

(c) The final task in this set of Exercises will be to find the sum of the masses of one atom each from every element. Though one might question the ultimate reason behind this task, it is certainly impractical with a calculator and a breeze with a spreadsheet. Corresponding to the change in part (b), type **=sum(C2:C11)** and hit the Enter key or edit **=count(B2:B11)** to **=sum(C2:C11)** and hit the Enter key. You should get something that looks like the image below.



This is the end of this **Further Adventures in Excel**. You may want to save your file and exit Excel.

This page was last revised on 19 Aug 2008.