

Civil Engineering Computation

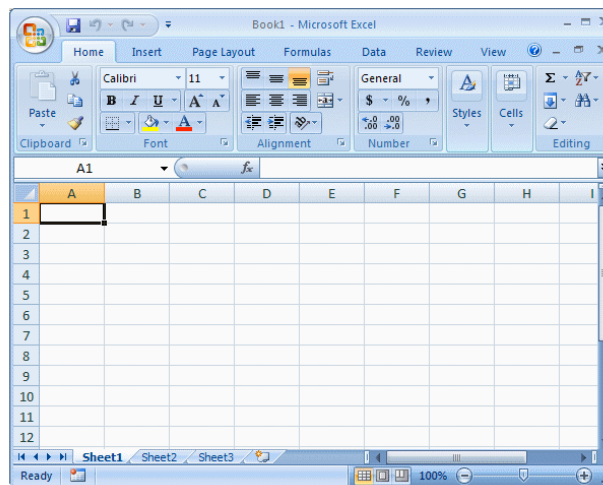
Initial Meeting and Class Setup
EXCEL Review Problems

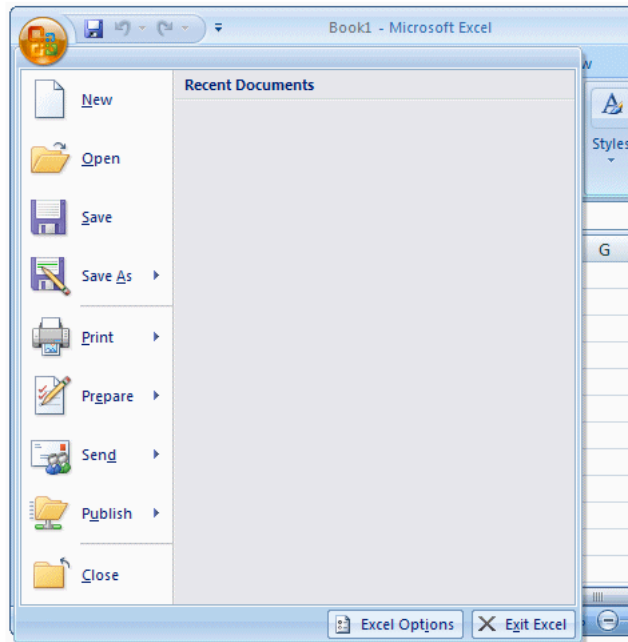


Big companies don't do business via chain letters. Bill Gates is not giving you \$1000, and Disney is not giving you a free vacation. There is no baby food company issuing class-action checks. Procter and Gamble is not part of a satanic cult or scheme, and its logo is not satanic. MTV will not give you backstage passes if you forward something to the most people. You can relax; there is no need to pass it on "just in case it's true." Furthermore, just because someone said in a message, four generations back, that "we checked it out and it's legit," does not actually make it true.



EXCEL Review

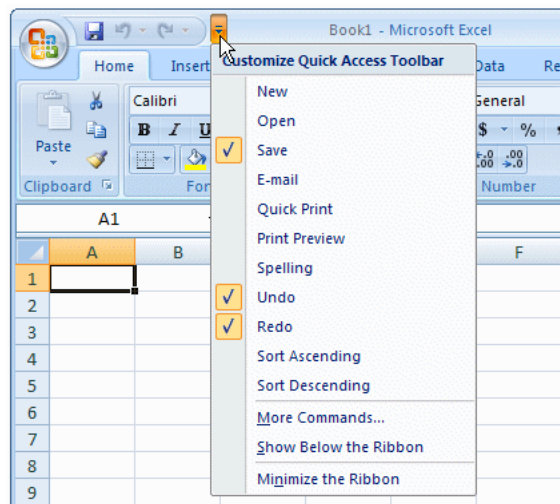




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EXCEL Review

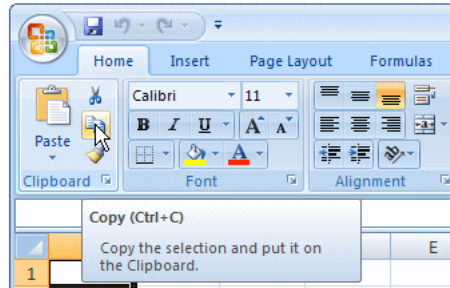


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EXCEL Review



EXCEL Review

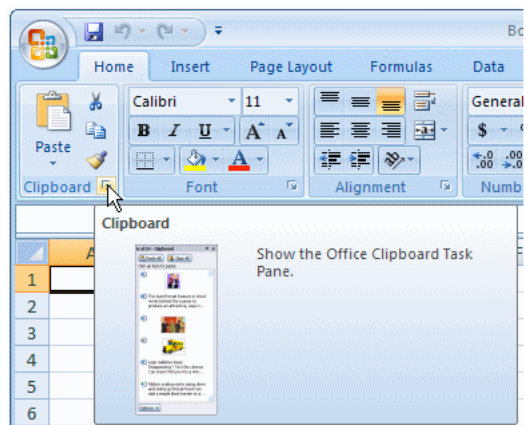


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EXCEL Review



EXCEL Review



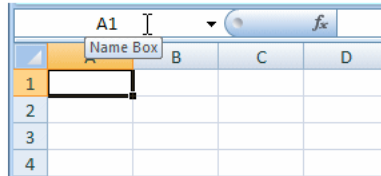
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EXCEL Review



EXCEL Review

Under the Ribbon, there is a white box displaying a name like A1 (it may not display A1...), that small box is called the Name Box:

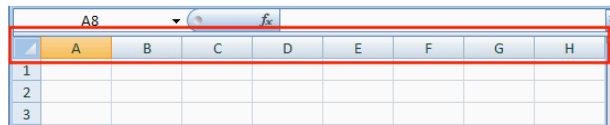


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EXCEL Review

The Column Headers

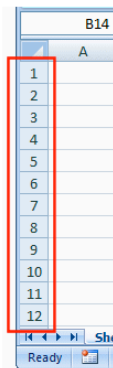
Under the Name Box and the Formula bar, you see the column headers. The columns are labeled A, B, C, etc:



There are 255 of columns.

The Row Headers

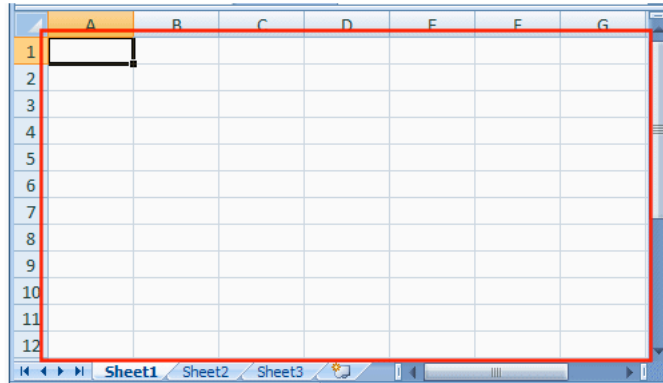
On the left side of the main window, there are small boxes called row headers. Each row header is labeled with a number, starting at 1 on top, then 2, and so on:



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The Cells

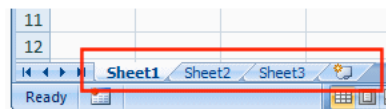
The main area of Microsoft Excel is made of cells. A cell is the intersection of a column and a row:



A cell is identified by its name and every cell has a name. By default, Microsoft Excel appends the name of a row to the name of a column to identify a cell. Therefore, the top-left cell is named A1. You can check the name of the cell in the Name Box.

The Sheet Tabs

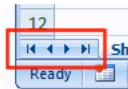
On the left side of the horizontal scrollbar, there are the worksheet tabs:



By default, Microsoft Excel provides three worksheets to start with. You can work with any of them and switch to another at any time by clicking its tab.

The Navigation Buttons

On the left side of the worksheet tabs, there are four navigation buttons:



If you happen to use a lot of worksheets or the worksheet names are using too much space, which would result in some worksheets being hidden under the horizontal scroll bar, you can use the navigation buttons to move from one worksheet to another.



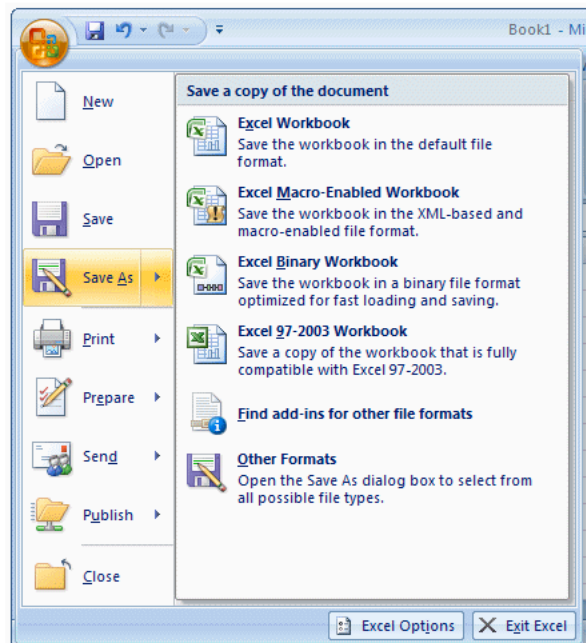
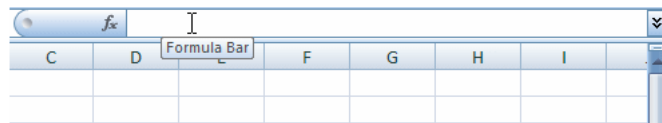
EXCEL Review

The Insert Function Button

On the right side of the Name box, there is a gray box with an fx button. That fx button is called the Insert Function button.

The Formula Bar

On the right side of the Insert Function button is a long empty white box or section called the Formula Bar:





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EXCEL Review



EXCEL Review

- When the file is opened in Microsoft Excel, you can click the Office Button, position the mouse on Prepare, and click Properties. This would display some of the most common attributes of the file:

To change an item, you can click its text box and edit or replace the content. To get more options, you can click the Document Properties button and click Advanced Properties...

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EXCEL Review



EXCEL Review

Navigate Your Workbook Using the Keyboard

| Key | Action |
|------------------|--|
| Left arrow | Move one cell left. |
| Right arrow | Move one cell right. |
| Up arrow | Move one cell up. |
| Down arrow | Move one cell down. |
| Enter | Move one cell down. |
| Tab | Move one cell to the right. |
| Ctrl + Home | Move to cell A1. |
| Ctrl + End | Move to the last used cell in the worksheet. |
| Page Up | Move up one page. |
| Page Down | Move down one page. |
| Ctrl + arrow key | Move to the next cell with data in the direction of the arrow key. If there is not another cell with data in that direction, you move to the last cell in the worksheet in that direction. |



EXCEL Review

Select a Contiguous Group of Cells

- Drag from the upper-left cell you want to select to the lower-right cell.

Select a Noncontiguous Group of Cells

- 1 Drag from the upper-left cell you want to select to the lower-right cell to select the first set of cells.
- 2 Hold down the Ctrl key, and drag to select another set of cells.



EXCEL Review

Select Rows or Columns

- 1 Click the header for the first row or column you want to select.
- 2 Hold down the Shift key, and click the header for the last row or column you want to select.

Select Noncontiguous Rows or Columns

- Hold down the Ctrl key, and then click the headers of the rows or columns you want to select.



EXCEL Review

Enter Text with Forced Line Breaks

- 1 Click the cell in which you want to enter text.
- 2 Type the text you want to appear on the first line. Press Alt+Enter to insert a line break.
- 3 Type the text you want to appear on the second line, and then press Enter.



EXCEL Review

Enter Numbers

- 1 Click the cell in which you want to enter a number.
- 2 Type a numerical value.
- 3 Press Enter.

Enter Numbers Using Scientific Notation and Exponents

- 1 Click the cell in which you want to enter a number.
- 2 Type the base number you want.
- 3 Type E.
- 4 Type the exponent you want.
- 5 Press Enter.

Tip

You can type a number but have it interpreted as a text value by typing ' (an apostrophe) before the number value. The apostrophe will not appear in the cell, but a green icon will appear in the corner of the cell; clicking the cell exposes formatting options you can apply to the data.



EXCEL Review

Enter a Date

- 1 Click the cell in which you want to enter a date.
- 2 Type the month, day, and year, with each number separated by a slash (/) or a hyphen (-).
- 3 Press Enter.

Enter a Time

- 1 Click the cell in which you want to enter a time.
- 2 Type the hour, a colon (:), and the minutes. Press the Spacebar, and type a or p for A.M. or P.M.
- 3 Press Enter.



EXCEL Review

Enter a Date and Time

- 1 Click the cell in which you want to enter a date and time.
- 2 Type a date, press the Spacebar, and then type a time.
- 3 Press Enter.

Enter the Current Date and Time

- 1 Click the cell in which you want to enter the current date and time.
- 2 Type =NOW().
- 3 Press Enter.



EXCEL Review

Fill Data Using AutoFill

- 1 Type the label or value you want to appear in multiple cells.
- 2 Drag the Fill handle down or across the cells you want to fill.

Use AutoFill to Enter a Series of Values

- 1 Type the first label or value for your list.
- 2 Type the second label or value for your list.
- 3 Select the two cells.
- 4 Drag the Fill handle to the cell containing the last label or value in the series.



EXCEL Review

Enter Data with AutoComplete

- 1 Type the beginning of an entry.
- 2 Press Tab to accept the AutoComplete value.

Pick Data from a List

- 1 Right-click a cell in a column with existing values, and then click Pick From Drop-Down List from the short-cut menu.
- 2 Click the item in the list you want to enter.



EXCEL Review

Add a Symbol to a Cell

- 1 Click the Insert tab.
- 2 Click Symbol.
- 3 Click the Font down arrow.
- 4 Select the font from which you want to pick the symbol.
- 5 Click the symbol you want to insert.
- 6 Click Insert.
- 7 Click Close.



EXCEL Review

Using the Office Clipboard

When you work in Excel, you can take advantage of the flexibility that comes with its place in the Office suite by using the Office Clipboard. The Office Clipboard keeps track of the last 24 items you've cut or copied from any Office document. You can open the Office Clipboard and then paste any of its contents into your workbook. If an item that you know you won't use again resides on the Office Clipboard, you can always remove it.

Display the Contents of the Office Clipboard

- 1 Click the Home tab.
- 2 Click the Clipboard dialog box launcher.

Paste an Item from the Office Clipboard

- 1 Click the cell into which you want to paste a Clipboard item.
- 2 Click the Clipboard item you want to paste.



EXCEL Review

Entering Data and Formatting Many Worksheets at the Same Time

After you work with Excel for a while, you'll probably develop standard worksheets you use over and over. When working with worksheets that follow a common layout, you might want to enter a set of data across multiple worksheets. For example, you might have a set of column headers you want to appear on several worksheets, and you would like to avoid creating

them from scratch for each individual worksheet. In Excel 2010, you can save lots of time by entering data and formatting in equivalent blocks of cells on multiple worksheets. If you have existing data you want to paste into several worksheets at the same time, you can do that as well.



EXCEL Review

Enter and Format Data on Several Worksheets at One Time

- 1 Hold down the Ctrl key, and click the sheet tabs of the worksheets you want to edit.
- 2 Select the cell or cells in which you want to enter the data.
- 3 Type the data you want to appear in the same cell or cells on the worksheets you selected.
- 4 Right-click the selected cells.
- 5 Using the Mini toolbar, specify the formatting options you want.
- 6 Press Enter.
- 7 Click the sheet tab of any unselected worksheet.



EXCEL Review

Copy Cells from One Worksheet to a Group of Worksheets

- 1 Click the Home tab.
- 2 Select the cells you want to copy.
- 3 Click the Copy button.
- 4 If you're copying the data to another worksheet, hold down the Ctrl key, and click the sheet tabs of the worksheets you want to receive the copied data.
- 5 Click the cell you want to receive the data.
- 6 Click Paste.



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View Multiple Workbooks at the Same Time

- 1 Open all the workbooks you want to view.
- 2 Click the View tab.
- 3 Click Arrange All.
- 4 Select the option representing the target arrangement.
- 5 Click OK.

View Multiple Parts of a Worksheet by Freezing Panes

- 1 Click the cell below and to the right of where you want to freeze the worksheet.
- 2 Click the View tab.
- 3 In the Window group, click Freeze Panes.
- 4 Click one of the following items:
 - Freeze Panes, which keeps the cells above or to the left of the current selection visible at all times
 - Freeze Top Row, which keeps the top row visible at all times
 - Freeze First Column, which keeps the leftmost column visible at all times

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EXCEL Review

Build a Formula

- 1 Click the cell in which you want to enter a formula.
- 2 Type =.
- 3 Type the expression representing the calculation you want to perform.
- 4 Press Enter.

Edit a Formula

- 1 Click the cell you want to edit.
- 2 Select the part of the formula you want to edit in the formula bar.
- 3 Make any changes that you want.
- 4 Press Enter.

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EXCEL Review



EXCEL Review

Assigning Names to Groups of Cells

When you work with large amounts of data, it's easy to lose track of which cells contain which data. In addition, it can be difficult to locate data in workbooks you didn't create. Although you might always store product prices in one worksheet column, there's no guarantee that your colleagues will follow the same pattern! One way to prevent confusion is to define a named range for any cell group that holds specific information. For example, in a worksheet with customer order data, you can define the Totals named range to represent the cells in which the total for each order is stored. After you define the named range, you can display its contents, rename it, or delete it.

Caution

The name you give your named range shouldn't duplicate a potential cell address. For example, typing DAY1 in a formula would reference cell DAY1. To avoid this problem, either ensure that your ranges have names that begin with at least four letters (the last column is XFD) or use an underscore to separate the letters from the rest of the name. The name DAY1 isn't valid, but the name DAY_1 is.

Create a Named Range

- 1 Select the cells you want to name.
- 2 Click the Name Box on the Formula Bar.
- 3 Type the name you want for the range.
- 4 Press Enter.

Go to a Named Range

- 1 Click the Name Box down arrow.
- 2 Click the range to which you want to go.



EXCEL Review

Create a Formula with a Named Range

- 1 Click the cell in which you want to enter a formula.
- 2 Type = followed by the formula you want. When you want to use a range that has a name, start typing the name instead of the cell address.
- 3 Click the named range in the Formula AutoComplete list that appears.
- 4 Press Enter.



EXCEL Review

List Functions Available from the Excel Library

- 1 Click the Insert Function button.
- 2 Display the drop-down list, and click the function category you want to view.
- 3 Click the function you want to examine.
- 4 Click OK.
- 5 Click Cancel to close the Function Arguments dialog box.



EXCEL Review

Use Function ScreenTips

- 1 Double-click a cell that contains a formula.
- 2 In the ScreenTip, click the function name to open the Help file entry for the function.
- 3 Click the Close button to close the Help window.
- 4 Click an argument to select the cells to which it refers.



EXCEL Review

Create an IF Function

- 1 Click the cell in which you want to enter an IF function.
- 2 Click the Formulas tab.
- 3 Click Logical.
- 4 Click IF.
- 5 Type a conditional statement that evaluates to true or false.
- 6 Type the text you want to appear if the condition is true.
- 7 Type the text you want to appear if the condition is false.
- 8 Click OK.



EXCEL Review

Find Cell Precedents and Dependents

- 1 Click the cell you want to examine.
- 2 Click the Formulas tab.
- 3 Using the controls in the Formula Auditing group, follow either of these steps:
 - Click Trace Precedents.
 - Click Trace Dependents.



E

Standard Excel Chart Types and Uses

| Chart Type | Use |
|--------------|--|
| Column | Compares categories of data in vertical format. |
| Bar | Compares multiple values in horizontal format. |
| Line | Displays trends in data over time. |
| Pie | Compares data as part of a contribution to a whole. |
| Scatter Plot | Compares pairs of values in a dot format. |
| Area | Compares the trend of values over time or categories. |
| Doughnut | Compares multiple series of data in a percent format. |
| Radar | Displays changes in values relative to a center point. |
| Surface | Displays trends in values across two dimensions. |
| Bubble | Compares sets of three values. |
| Stock | Displays a chart to compare stock prices. |
| Cylinder | Same as a column or bar chart, but a cylinder is used instead. |
| Cone | Same as a column or bar chart, but a cone is used instead. |
| Pyramid | Same as a column or bar chart, but a pyramid is used instead. |



EXCEL Review Problem 1

- o Four hundred grams of nitrogen gas (MW = 28 g/mole) are stored in a 10-liter container. Set up an EXCEL worksheet to determine the pressure of the gas (in atmospheres) as a function of temperature and volume, assuming that nitrogen is an ideal gas. Use the ideal gas law

$$PV = nRT$$



EXCEL Review Problem 1

- P = Pressure in atmospheres
- V = Volume in liters
- n = moles of gas (mass of gas / mw of gas)
- R = ideal gas constant (0.082054 liter atm/ mole K)
- T = absolute temperature (degrees C + 273)

$$PV = nRT$$



EXCEL Review Problem 1

- Set up the heading as detailed for the class on your worksheet
- Use names for each of the variables in the calculation
- Use one column for a calculation at 22 degrees C
- Use a second column for a calculation at 37 degrees C



EXCEL Review Problem 1

- o Label the worksheet tab for the problem as Review 1
- o Save the workbook as Class 1



EXCEL Review Problem 2

- o In the design of a heat exchanger, you have to one pipe flowing within another. You have to select the pipes so that the flow in each pipe will be the same. The pipes each have the same flow velocity so they have to have the same cross sectional areas.
- o The inner pipe is given the subscript 1 and the outer pipe is given the subscript 2.



EXCEL Review Problem 2

- o The area of the inner pipe would be

$$Area_1 = \frac{\pi}{4} (d_1 - 2t_1)^2$$

The area of the outer pipe would be

$$Area_2 = \frac{\pi}{4} (d_2 - 2t_2)^2 - \frac{\pi}{4} (d_1)^2$$



EXCEL Review Problem 2

- o Set up the worksheet to solve for d_2 given the values for d_1 , t_1 , and t_2 .
- o First try setting up the solution using algebra to isolation d_2 and using EXCEL formulas
- o They use Goal Seek to solve for d_2
- o Name the variables in the sheet
- o Name the worksheet Review 2



EXCEL Review Problems

- Within each row of column C, please the sum of the corresponding values in columns A and B.
- In column D, place one of the following labels within each row:



EXCEL Review Problems

- If the value in column C is 7 or 11, display “You Win”
- If the value in column C is 2, 3, or 12, display “You Lose”
- Any other value, display “Inconclusive”



EXCEL Review Problems

- o The following table describes an environmental reaction for three chemical compounds as a function of time.



| Time (sec) | Conc A (mg/L) | Conc B (mg/L) | Conc C (mg/L) |
|------------|---------------|---------------|---------------|
| 0 | 5 | 0 | 0 |
| 1 | 4.5 | 0.46 | 0.02 |
| 2 | 4.1 | 0.84 | 0.06 |
| 3 | 3.7 | 1.2 | 0.13 |
| 4 | 3.4 | 1.4 | 0.22 |
| 5 | 3 | 1.6 | 0.33 |
| 6 | 2.7 | 1.8 | 0.45 |
| 7 | 2.5 | 1.9 | 0.58 |
| 8 | 2.3 | 2 | 0.72 |
| 9 | 2 | 2.1 | 0.87 |
| 10 | 1.8 | 2.2 | 1 |
| 12 | 1.5 | 2.2 | 1.3 |
| 14 | 1.2 | 2.2 | 1.6 |
| 16 | 1 | 2.1 | 1.9 |
| 18 | 0.83 | 2 | 2.2 |
| 20 | 0.68 | 1.85 | 2.5 |
| 25 | 0.41 | 1.5 | 3.1 |
| 30 | 0.25 | 1.2 | 3.5 |
| 35 | 0.15 | 0.93 | 3.9 |
| 40 | 0.09 | 0.71 | 4.2 |



EXCEL Review Problems

- Enter the data into an EXCEL worksheet.
- Plot all three concentrations as a function of time on the same graph.
- Each plot should be an x-y scatter type plot with a smooth curve between the points.
- Show all the individual data points.
- Display each data set in a different color.
- Save the graph on its own worksheet (chart).