# An Introduction to Graphing in Excel

This example uses Excel to graph Y vs X. This problem starts as follows:

1.Complete the following table and on graph paper, graph the line for the equation

$$x - 2y = -6$$

Identify the x-intercept and the y-intercept on your graph and indicate their values as ordered pairs below.

x	у
6	
	4
8	

Excel will be used to graph the three points and derive the slope-intercept form of the equation of this line.

#### Entering and formatting data

Open Excel

Instructions to click on something to select it refer to a single "Left Click" of your mouse unless instructed otherwise.

The phrase "extended options" in some instructions for pull-down menus refers to the double v icon at the bottom of the menu that appears on newer versions of MS software and allows you to access less-used menu options. Clicking on this is not always necessary for a full set of options to appear.

It is suggested that you save your work often.

Type in Column names along Row 1. Enter the first column name X in cell A1 and Y in cell B1. For clarity, Row numbers and Column letters are shown in Figure 1 below. These would <u>not</u> be typed in by you.

Note that in Excel the first column will be graphed on the horizontal axis and the second column on the vertical axis of your graph.

Enter the three values for X in column A. Enter the corresponding values for Y in column B.

(Row #)	Α	В	С	D	
1	Х	Y			
2		6	6		
3		2	4		
4		8	7		
5					
6					
7					

Figure 1. The appearance of your spreadsheet after you have entered your data. For clarity the Row numbers as well as the letters designating Columns are shown. See Figure 2 for the appearance of the spreadsheet after formatting.

## Formatting

As shown in Figure 1, the headings do not appear over the columns of data. Formatting will make the table of data easier to read on the screen and in your printout.

Format headings, bold

Click on Row #1 to Highlight Row 1

Click on the icon to bold-face the text

Format values and headings, centering

Click on Row #1 to Highlight Row 1. Hold down the Shift key and click on Row #4. Rows #1 – #4 are now highlighted.

Click on the icon to center the text and values

Figure 2 shows the results of the formatting on the appearance of your spreadsheet data.

(Row #)	Α	В	С	D	
1	Х		Υ		
2	6		6		
3	2		4		
4	8		7		
5					
6					
7					

Figure 2. The appearance of your spreadsheet after you have formatted your data. As shown here the labels X and Y have been bold-faced and centered in the columns. The values are centered in the columns.

Graphing

Highlight your column headings and data area by clicking and dragging from the upper left where the column heading X appears down to the lower right corner where the value 7 appears

Select Chart Wizard Icon or Insert Menu  $\rightarrow$  Chart

#### Chart Wizard – Step 1 of 4 – Chart Type

Chart Type is "X-Y (Scatter)" for scientific graphing. Click once on "X-Y (Scatter)"

Note: If your graphs in this class are not producing correct analysis of data, the most common error is to select some other type of Chart Type. "X-Y (Scatter)" must be selected for our purposes.

Under "Chart sub-type" select "Scatter with data points connected by smoothed lines" by clicking on it once Click Next

Chart Wizard – Step 2 of 4 – Chart Source Data Click on "Series" Tab Note the following on your screen: X-values come from cells A2 through A4 Y-values come from cells B2 through B4 The name of the chart comes from cell B1 and is Y Click Next

Chart Wizard – Step 3 of 4 – Chart Options

"Titles" is the first tab selected

Type in a "Chart Title" for your graph: Problem #13 Graph of Y vs X

Press your Tab button

Type in "Value (X) axis" for your graph: X

Press your Tab button

Type in "Value (Y) axis" for your graph: Y

Press your Tab button

Click on "Gridlines" tab

Select "Major Gridlines" and "Minor Gridlines" under "Value (X) axis" by clicking in the empty square boxes

Since "Major Gridlines" is already selected by default under "Value (Y) axis", select "Minor Gridlines" by clicking in the empty square box

Note: Do not worry at this point about how many lines appear on the sample graph on your screen as you will change the gridline values shortly to make the graph more easily read.

Click on "Legend" tab

Deselect "Show Legend" by clicking in square box with a check in it. Since only one data set is being graphed, a legend is not needed and you will have a larger area for your graph.

These are all of the "Options" changes to be made now Click Next

Chart Wizard – Step 4 of 4 – Chart Location Leave the default setting of "Place Chart" as object in "Sheet 1" Click Finish

Your graph appears in your spreadsheet as shown in Figure 3.

Notes: As long as the small black squares appear around the border of the entire graph area, as shown in Figure 3, you can click inside the borders when you see the dialog box "Chart Area" and drag the entire graph anywhere you want to position it. This is important if it is covering data that you want to see.

It is easy to deselect the chart area in any of the steps below by clicking outside the chart area. To regain selection of the entire chart area move your cursor around inside the graph area <u>slowly</u> without any buttons pushed down until the message "Chart Area" is shown on your screen and Left Click once.

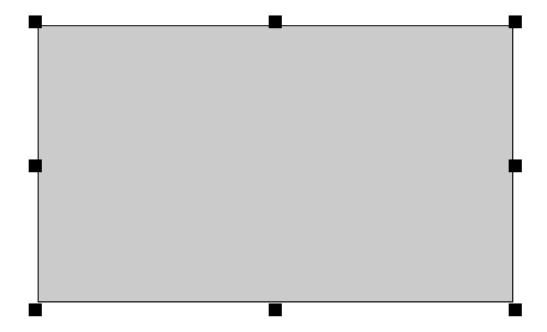


Figure 3. The appearance of your first graph before the formatting changes are made below. The plot of the data may appear colored on your screen, but will only print out as a shade of gray and may be lost in the gray plot-area background color. The black squares around the periphery of the graph show that "Chart Area" is selected in your spreadsheet.

## Formatting the axes

Move your cursor around slowly along the scale of the Y – axis without any buttons pushed down until the message "Value (Y) Axis" is shown on your screen When you see this, Left Click twice quickly A "Format Axis" screen appears Click on the "Scale" tab and you will see the default values set by the computer for your graph. You can change these by double-clicking your

left mouse button in the appropriate box. The default values for "Minimum" and "Maximum" are acceptable. You want to change the values of "Major unit" and "Minor unit" as follows:

Type in a new "Major Unit" of 2

Type in a new "Minor Unit" of1

Click OK and your scale for the Y – axis will be more realistic

Move your cursor around slowly along the scale of the X – axis without any buttons pushed down until the message "Value (X) Axis" is shown on your screen When you see this, Left Click twice quickly

A "Format Axis" screen appears

Click on the "Scale" tab and you will see the default values set by the computer for the X-axis of your graph. The default values for "Minimum", "Maximum" and "Major Unit" are acceptable. You want to change the value of the "Minor unit" as follows:

Type in a new "Minor Unit" of 1

Click OK

Note: With practice, you will change the values of these four axis formatting variables to control the range of your graph and how many gridlines are labeled ("Major") and appear as unlabeled ("Minor"). If too many lines appear, they may make the graph unreadable. If not enough lines appear, you may not be able to interpret the data from the graph.

## Removing "Plot Area" fill

Move your cursor around inside the graph area slowly without any buttons pushed down until the message "Plot Area" is shown on your screen When you see this, Left Click twice quickly A "Format Plot Area" screen appears Under "Area" select "None" and click OK to remove the gray fill in your graph

Figure 4 shows how your graph appears after completing these format changes.

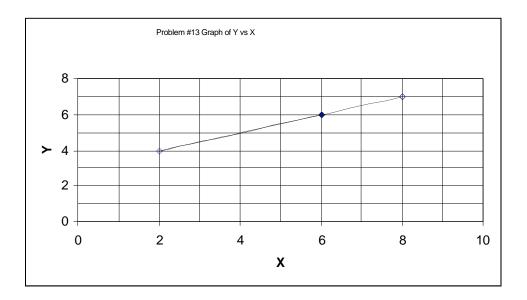


Figure 4. The appearance of your first graph after the formatting changes are made to the scales of the axes and the gray fill is removed from the plot area.

## Adding the Trend line and Equation to your Graph

Obtaining the y = mx + b form of your equation
Move your cursor around inside the graph area slowly without any buttons pushed down until the message "Chart Area" is shown on your screen
When you see this, Click once to select the "Chart Area"
Select Chart Menu → Extended Options → Add Trend line opens "Add Trend line" window → Under "Trend/Regression type" click on "Linear"
Left Click on the "Options" Tab → Select "Display Equation on Chart" → OK
On your graph appears the equation for the line
If you Left Click on the equation and hold down, you can drag the equation to a more convenient location. The equation was repositioned this way in Figure 5.

In the example, the equation is y = 0.5x + 3

Figure 5 shows how your graph appears after completing changes.

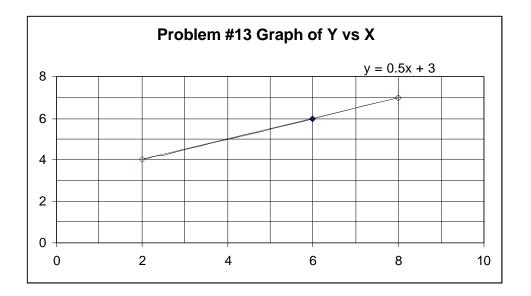


Figure 5. The trend line has been added to the graph and its equation appears below the title of the graph in the upper right-hand corner. Since both the graph of the three data points and the trend line are identical lines, the trend line covers the original line and only one line appears on the graph.

#### Printing from your spreadsheet

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Preparation for Printing Your Graph
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Make sure the "Chart Area" is selected

Select the "Print Preview" Icon or select the "File" menu → "Print Preview" to see what your graph will look like before you print it

Printing Your Graph

Make sure the "Chart Area" is selected Select the "Print" Icon or select the "File" menu  $\rightarrow$  "Print"  $\rightarrow$  OK

An example of what your graph printout should look like is shown in Figure 5. Your printout should show a full-page graph.

Preparation for Printing Your Data

Left Click and Drag to highlight your column headings and data area from the upper left where the column heading X appears down to the lower right corner where the value 7 appears

Select the "File" menu → "Print Area" → Click on "Set Print Area" Under "File" menu → "Page Setup" select the "Sheet" tab and select "Gridlines" under Print and click OK

Printing Your Data

Select the "Print" Icon or select the "File" menu  $\rightarrow$  "Print"  $\rightarrow$  OK Figure 6 shows a sample of a properly formatted printout of data from your spreadsheet.

X	Y	
6	6	
2	4	
8	7	

Figure 6. A properly formatted printout of data from your spreadsheet will look like this on a sheet of paper. This is a simple example showing only your data. More detail will be added to future spreadsheets and the resulting printouts in upcoming exercises. A complete data printout from your spreadsheet is to accompany all lab graph submissions in this course.