

Generating a Simple X-Y Plot with Excel 2013

1. Open Excel

After the login is complete, the **Start** button will appear at the bottom left of the screen. Click on this button, then click **All Apps** and click on **Excel 2016** in the options under the **E** folder.

2. Entering and Editing Data

Notice the cell structure of the worksheet. Only one cell may receive data at a time. To select a cell, move the cursor and click on that cell. Type the data you wish to enter. Pressing **Enter** moves down one cell, **Tab** advances to the cell to the right. The arrow keys also enter the data and move one cell in the direction of the arrow. To edit the contents of a cell, double-click on the cell. Notice that the cursor changes while in the cell to be edited. Press the **backspace** key to delete characters, or type any characters you wish to add. Press the left mouse button and drag the cursor over the cell contents to select portions or the entire contents. Press **Enter** to leave edit mode. Cell contents can also be edited in the **formula line** at the top of the page. Click on a cell, then place the cursor in the desired location in the **formula line** and make the changes, then press **Enter**. Entire rows or columns may also be selected by clicking on the row number or the column heading letter.


In the following example, you will generate data for the sine and cosine function from 0 to 360 degrees and plot the results on a graph. The resulting spreadsheet and chart are included at the end of this handout.

3. Enter Column Labels

Select cell A1 by clicking on it. Enter the label **Degrees**. Enter the labels **Sine** and **Cosine** in cells B1 and C1 in the same manner. Your spreadsheet should look like this:

	A	B	C
1	Degrees	Sine	Cosine
2			

4. Enter Degree Data

Select cell A2 and enter **0** then press **Enter**. Make A2 the active cell again by clicking on it. To create a column of values from 0 to 360, click on **Home**, in the top menu, then in the **Editing** group click on **Fill** , then **Series**. From the **Series** dialog box select **Series in Columns** and set **Step Value = 10** and **Stop Value = 360** in the boxes below. Choose **OK** to exit, and the values will be automatically filled in the A column.

5. Generate Sine and Cosine Data

Select cell B2, then go to the **Formulas** tab and click on **Insert Function (fx)**. In the **Select a Category** box of the Insert Function Wizard select **Math & Trig**, then scroll the Function Name list and select **SIN**. Click on **OK**. Next we will need to provide the argument for the sine function (an angle in radians). A formula palette will appear. Click on the button on the right side of the formula bar labeled **Number**. Click on the A2 cell to select it as the argument for the radians function, and then click back on the right side of the formula bar. When formula palette appears again, select **OK**. The formula line should read: **=SIN(A2)**. Now to change the argument from degrees to radians you need to add a **radians** command to the left of the of the **A2**. The formula line should now read **=Sin (radians(A2))**

To set up the cosine function, we will copy the function for the sine into column C and then modify it. Select cell B2 and then click the right mouse button. Select **Copy** from the **Home** tab in the **Clipboard** group. The cell will be highlighted with a moving border. Select cell C2 and press **Enter**. Notice that the value of the cell is now **=SIN(radians(B2))** (the sine of the value of the radians). To change this, with cell C2 still active, click on the formula bar. Double-click on the cell reference B2 and then click on cell A2 to replace the highlighted B2. Next, double-click on the function **SIN** in the formula bar, then type **COS** followed by **Enter**. The first two rows of your spreadsheet should now look like this:

	A	B	C
1	Degrees	Sine	Cosine
2	0	0	1

To fill in the rest of column B with the appropriate values, select cell B2, click on the corner when a small cross appears and hold down the mouse button while dragging down to B38. The angle reference (A2 in the first cell) is automatically updated for each row. Fill in column C in the same way.

6. Format the Data

Select cells B2 through C38, then select **Format** in the **Cells** group under the **Home** menu. In the **Format Cells** dialog box click on the **Number** folder tab. Chose **Numbers** in the **Category** list, then enter **3** in the **Decimal Places** box and click **OK**. This will format the selected cells to display numbers with three decimal places. You could also have used the **Increase Decimal** and **Decrease Decimal** buttons on the toolbar menu in the **Number** group. Note the other formats available.

Making an X-Y Plot

1. Create the plot

Select all three columns of data (including titles). Click on **Insert** in the menu bar and in the **Charts** group select the chart type you would like. In this case, choose a scatter plot with only markers. The graph will pop up along with a new menu at the top, **Chart Tools**. There are several options for formatting and changing the graph under the **Chart Tools** menu.

2. Customize the Graph

To change the size of the plot on the worksheet, single click on the plot window and use the mouse to drag the edges of the plot window which show up in light grey and have four little dots where you can drag the chart edges around. The plot can be repositioned on the worksheet by selecting it and dragging it with the mouse.

To edit the graph, click the mouse on the plot window. Notice that the top level menu items change when the plot is selected in this way. To change anything on the plot, click on that portion of the graph. If you double-click on any part of either axis or the data curve itself, a window will appear that allows for changes in line type, color, etc.

Save and Exit

1. Save the Worksheet and Chart

Select **Save As** under the **File tab** at the top. Enter a filename into the **File Name** box. If you want to save to a different drive begin your file name with the drive letter, e.g. **a:**, or select from the list of drives in the box to the left. Click on **Save** to exit.

If you wish to import your spreadsheet data into a different package, you can save it under a different format. To do this, choose **Save As**, then select a file type from the list under **Save as Type**. Type the filename in the box as before. The filename will automatically be given an extension appropriate for the given type, e.g. **.txt** for a text file. **Caution:** If you save your work as a **.txt** file, you will lose all formulas and formatting.

2. **Print the Worksheet and Chart**

To print the worksheet with the chart on it, select **Page Setup** under the **Print Preview** section of **Print** under the **File tab**. When the **Page Setup** dialog box appears, click on the **Margins** folder tab and set the margins as desired. Then click on the **Header/Footer** folder tab and select a predefined header and footer from the lists under **Header** and **Footer** or type in your own after clicking on **Custom Header** and **Custom Footer**. Now click on the **Page** folder tab and check the desired page orientation (**Portrait** or **Landscape**). To select a printer click on **Print**. The printer that is currently selected will appear in the **Name** box. You can select a different printer from the drop-down under this box. Clicking **OK** from the **Print** dialog box will then send the worksheet to the selected printer.

To print just the chart, click on it, then follow the procedure above. The options for margins, headers and footers, printer selection, etc. are the same as above. When you click **Print**, **Selected Chart** will be selected in the **Print What** area.

3. **Exit Excel**

Select **Exit** under the **File tab**. The following page shows what the completed worksheet and chart should look like.

degree	sin	cos
0	0.000	1.000
10	0.174	0.985
20	0.342	0.940
30	0.500	0.866
40	0.643	0.766
50	0.766	0.643
60	0.866	0.500
70	0.940	0.342
80	0.985	0.174
90	1.000	0.000
100	0.985	-0.174
110	0.940	-0.342
120	0.866	-0.500
130	0.766	-0.643
140	0.643	-0.766
150	0.500	-0.866
160	0.342	-0.940
170	0.174	-0.985
180	0.000	-1.000
190	-0.174	-0.985
200	-0.342	-0.940
210	-0.500	-0.866
220	-0.643	-0.766
230	-0.766	-0.643
240	-0.866	-0.500
250	-0.940	-0.342
260	-0.985	-0.174
270	-1.000	0.000
280	-0.985	0.174
290	-0.940	0.342
300	-0.866	0.500
310	-0.766	0.643
320	-0.643	0.766
330	-0.500	0.866
340	-0.342	0.940
350	-0.174	0.985
360	0.000	1.000

