

# **Making Graphs In Microsoft Excel 2013:**

## **A Short Tutorial**

*Written by Justin Feng for Physical Science 303*

*January 11, 2014*

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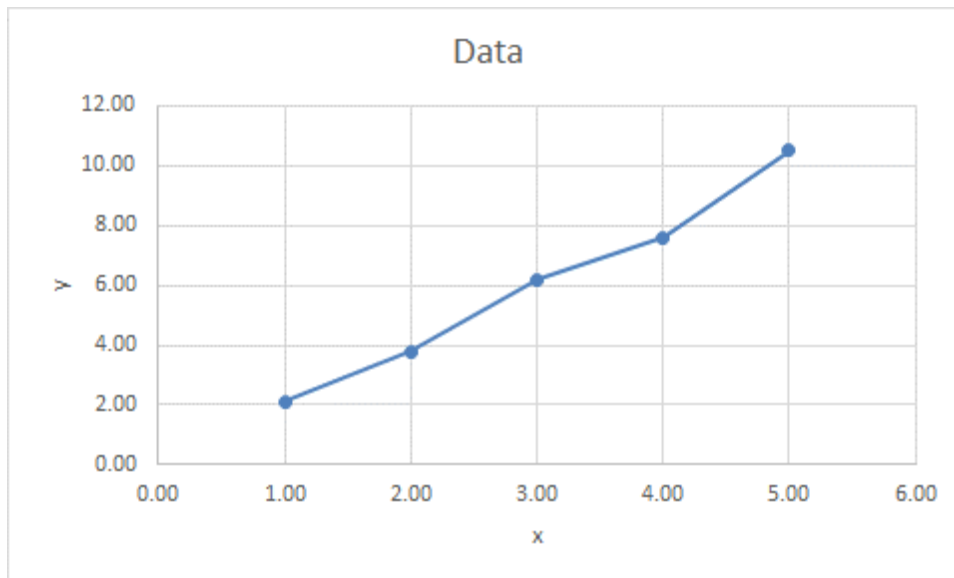
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## **Chapter I: The Basics**

In this Chapter, you will learn how to turn this list of numbers:

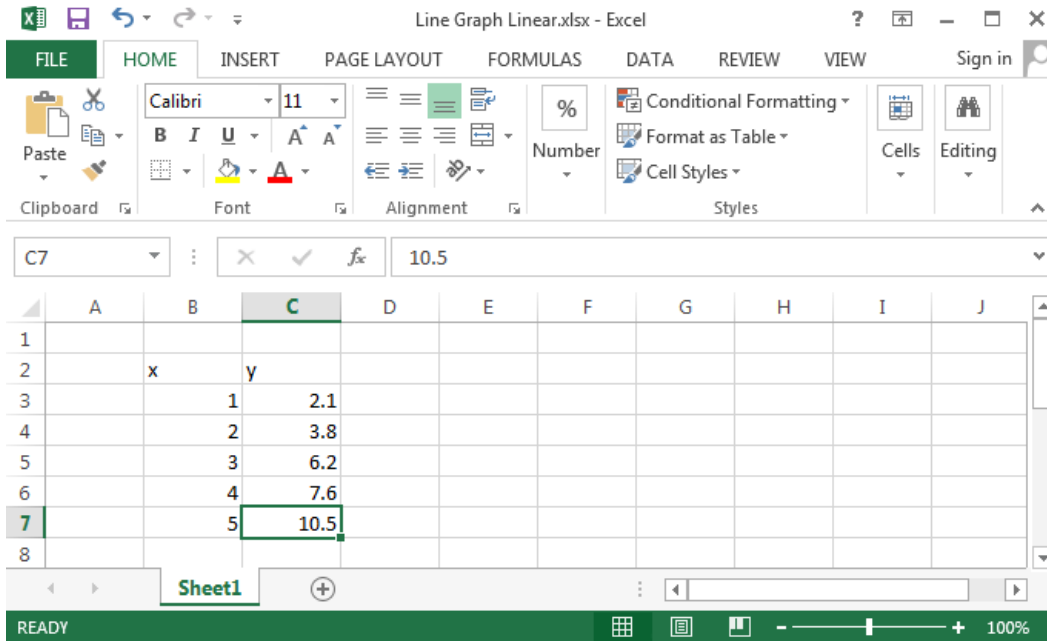
| x    | y     |
|------|-------|
| 1.00 | 2.10  |
| 2.00 | 3.80  |
| 3.00 | 6.20  |
| 4.00 | 7.60  |
| 5.00 | 10.50 |

into this graph:



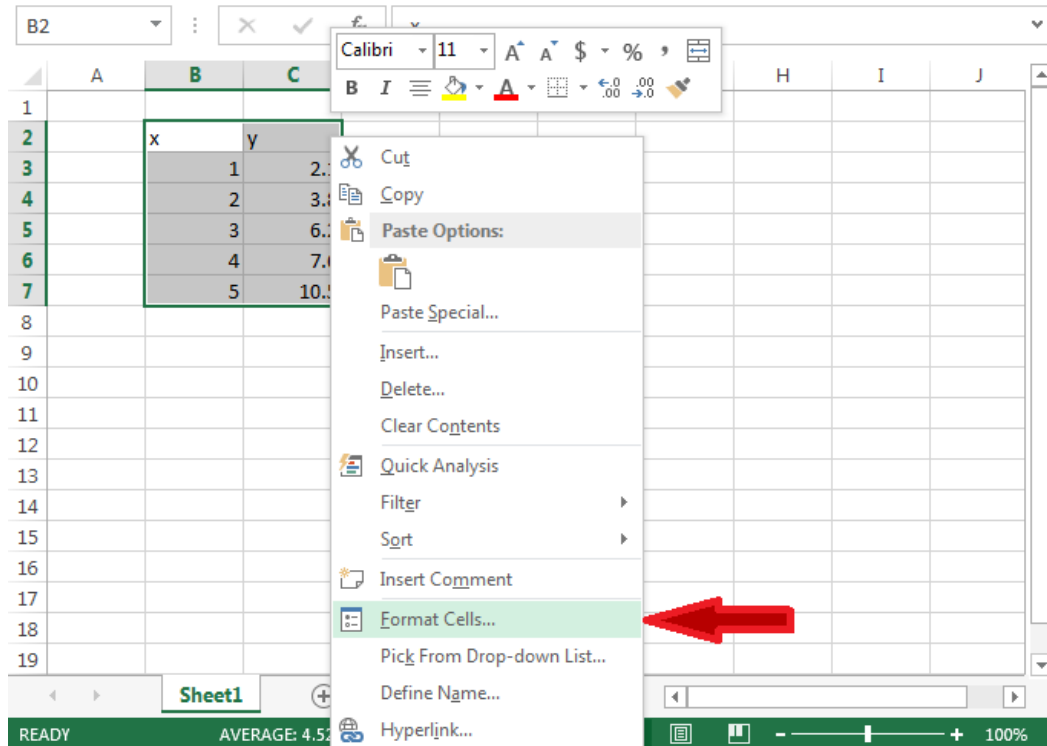
## Entering Data

- 1) Open a New Blank Workbook in Excel, and enter the data into the workbook:

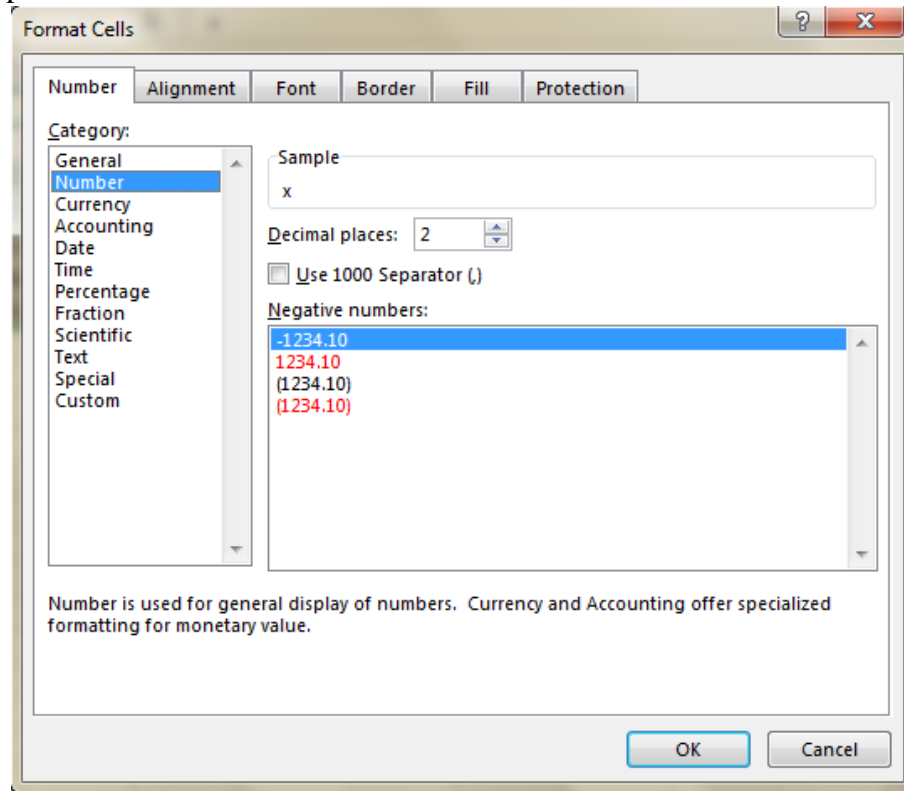


Note that the x-values do not show the correct decimal places; even if you explicitly type “1.0” into a cell, it will still display “1.” To fix this, go to the next step:

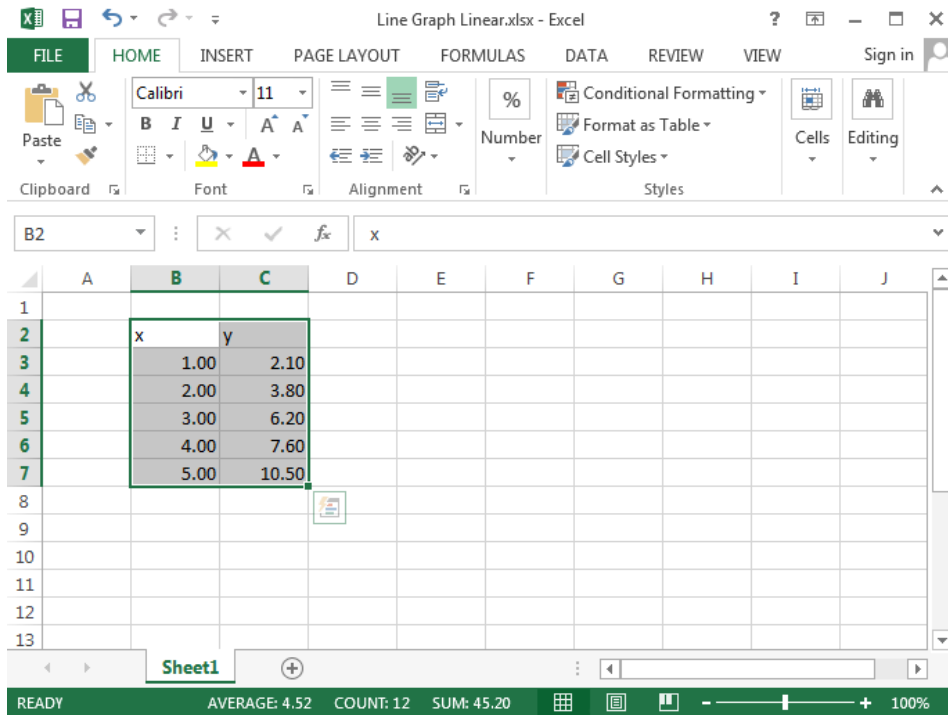
- 2) Select the data, and right-click on the selected data (ctrl-click for Mac). A menu will open; click on the “*Format Cells*” option:



- 3) The following box will open. Under the Category menu, select “Number” and set the number of decimal places to 2:

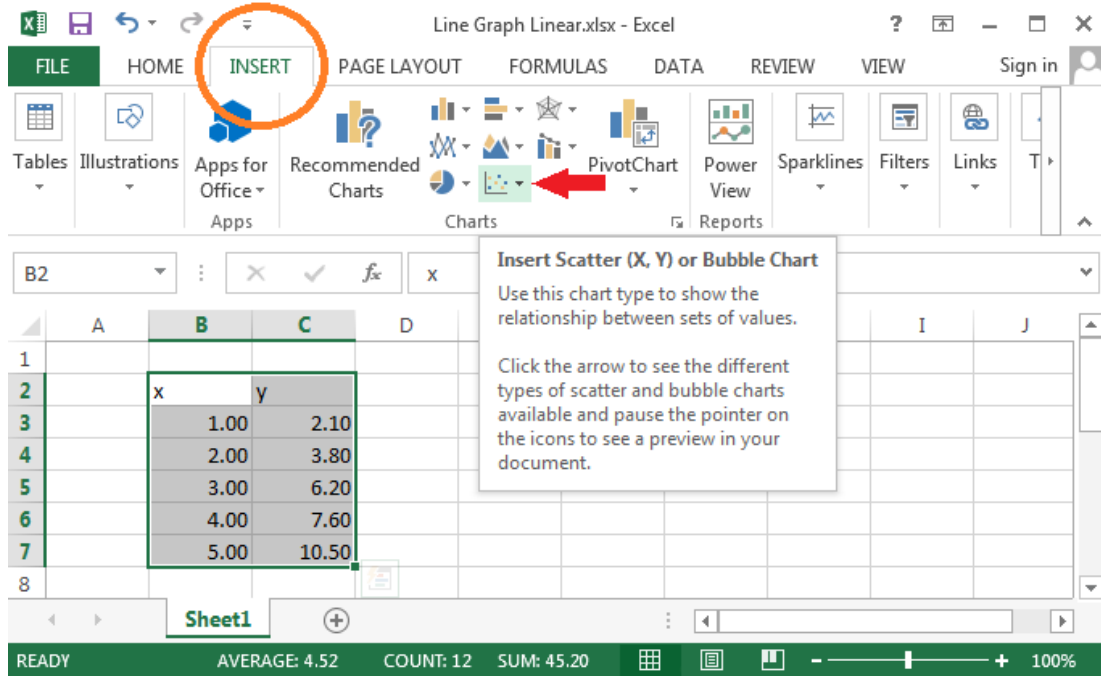


After clicking *OK*, the data should look like this:

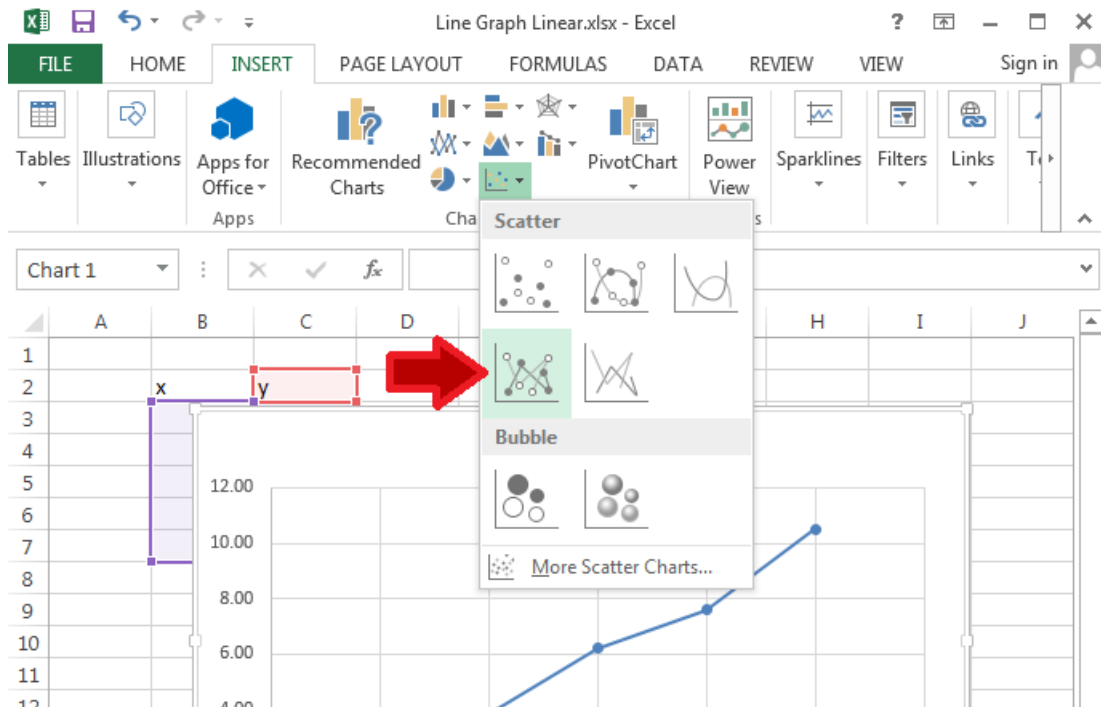


## B. Graphing Data

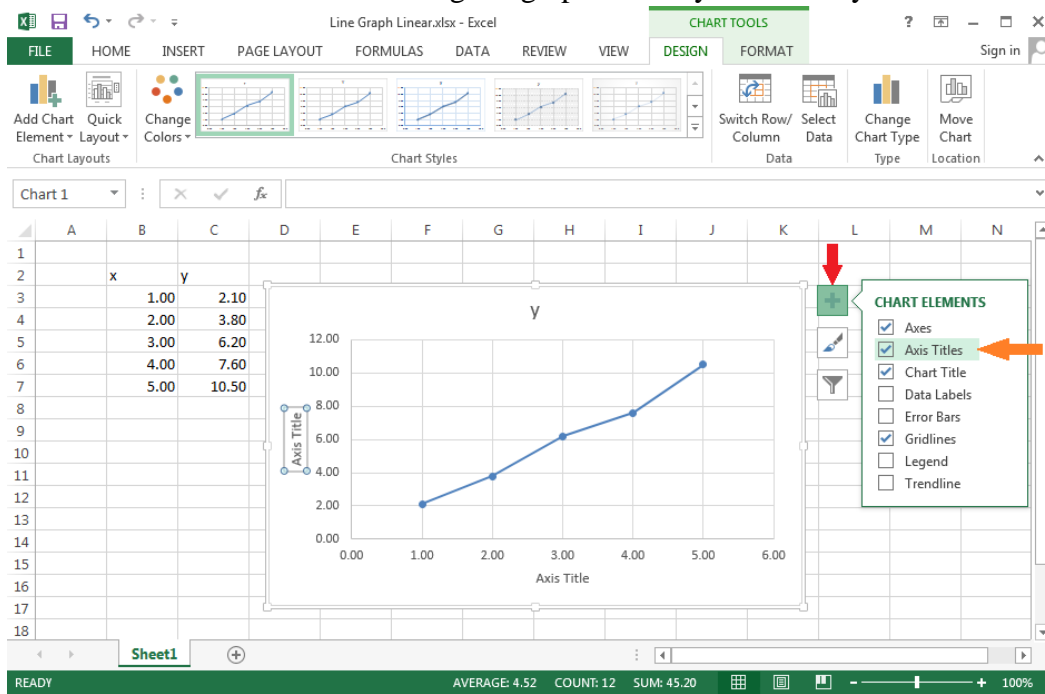
- 4) To make a graph, click on the “*INSERT*” tab at the top of the window (indicated by the orange circle). Then select the data and click on the “*Insert Scatter (X,Y) or Bubble Chart*” option (indicated by the red arrow):



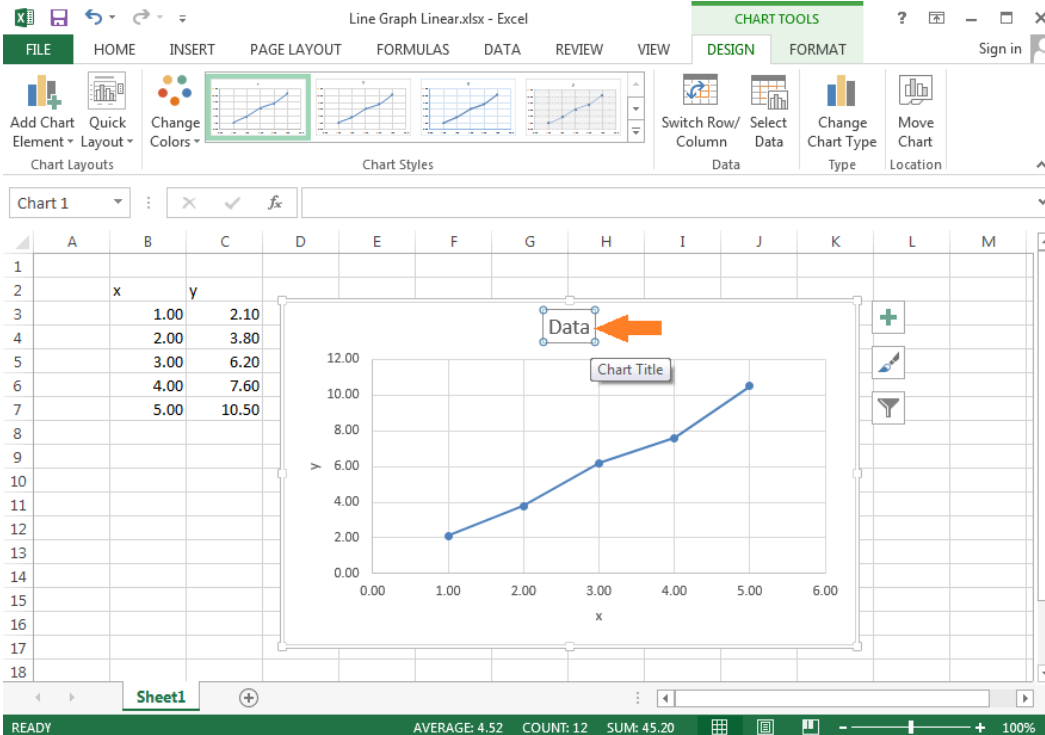
- 5) The following menu will open. Click on the highlighted option to make a graph (this makes a graph where the data points are connected by lines).



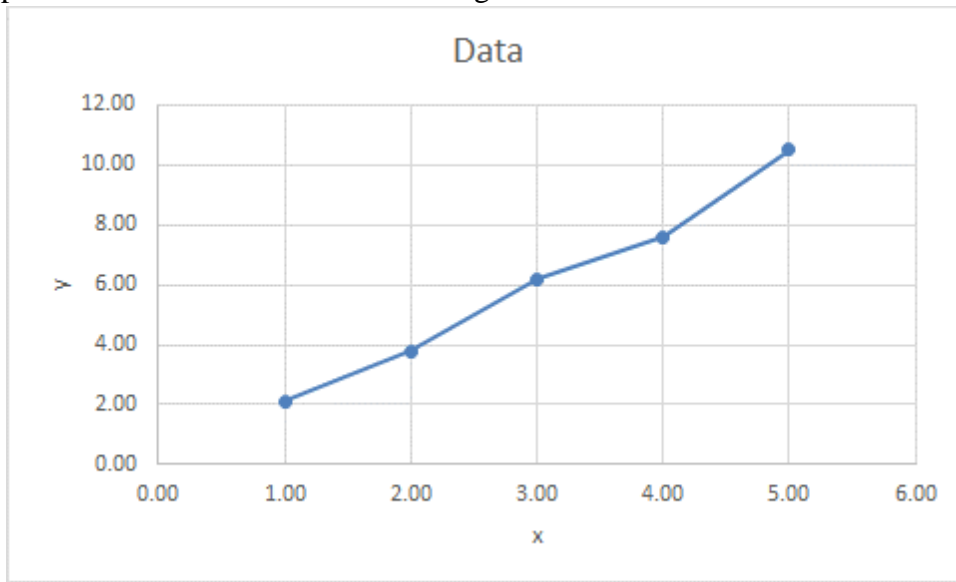
- 6) We are not done yet! Click on the graph, and a green “+” sign will appear next to the upper right-hand corner of the graph. Click on the “+” sign and a menu will appear. Select the option labeled “Axis Titles.” You can also drag the graph so that you can see your data:



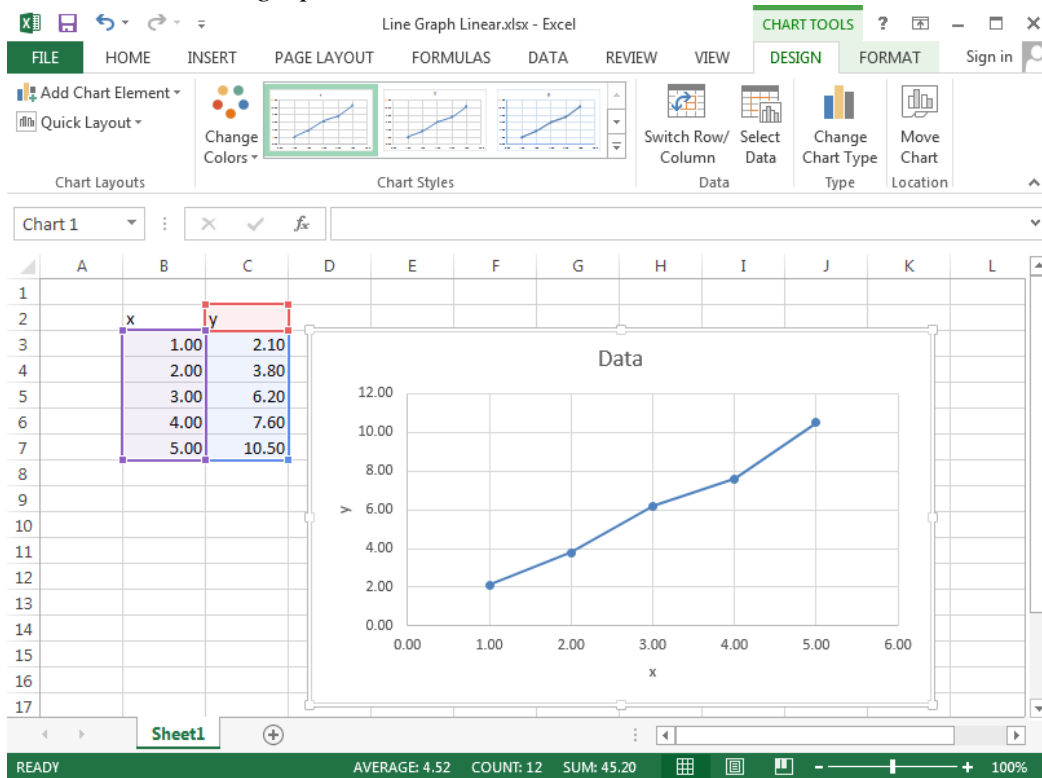
- 7) Now rename the axis titles by clicking on them; the horizontal axis represents the column with the x-values, and the vertical axis represents the column with the y-values. You can also change the title for the graph by clicking on the chart title (indicated by the orange arrow):



8) Your graph should now look like the following:



*Comment: Click on the graph. Your screen should look like this:*



*The x-axis of the graph represents the values in the highlighted purple box, and the y-axis represents the values in the highlighted blue box. The column of numbers that correspond to the x-axis should be to the left of the y-axis.*



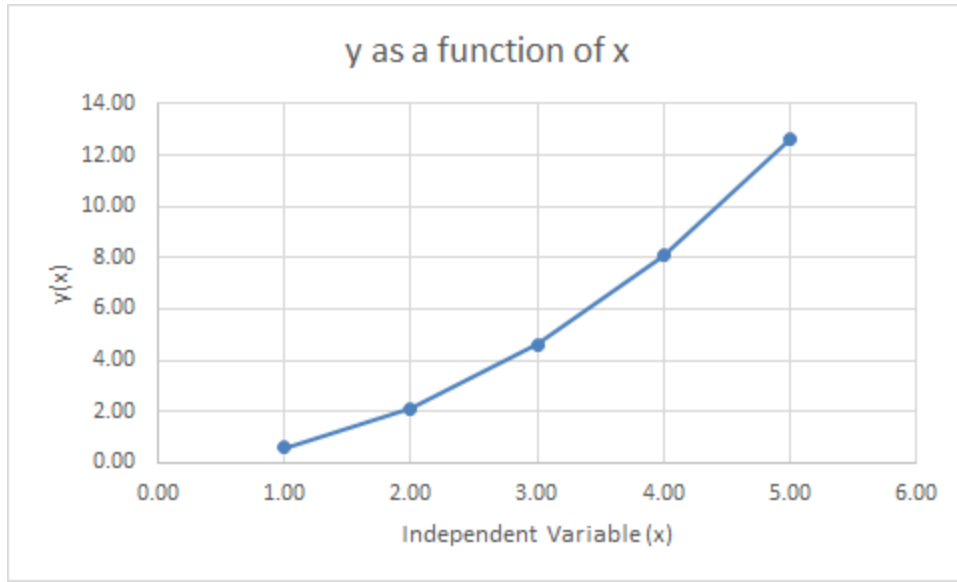


## Chapter II: Graphing Functions

In this chapter, you will learn how to turn this formula:

$$y = \frac{1}{2}x^2 + 0.1$$

Into this graph:

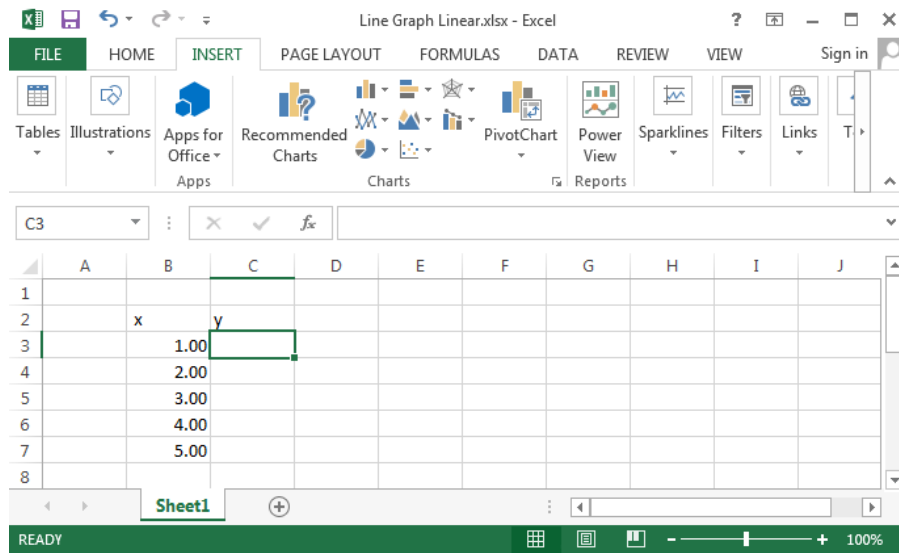


### Creating a Table

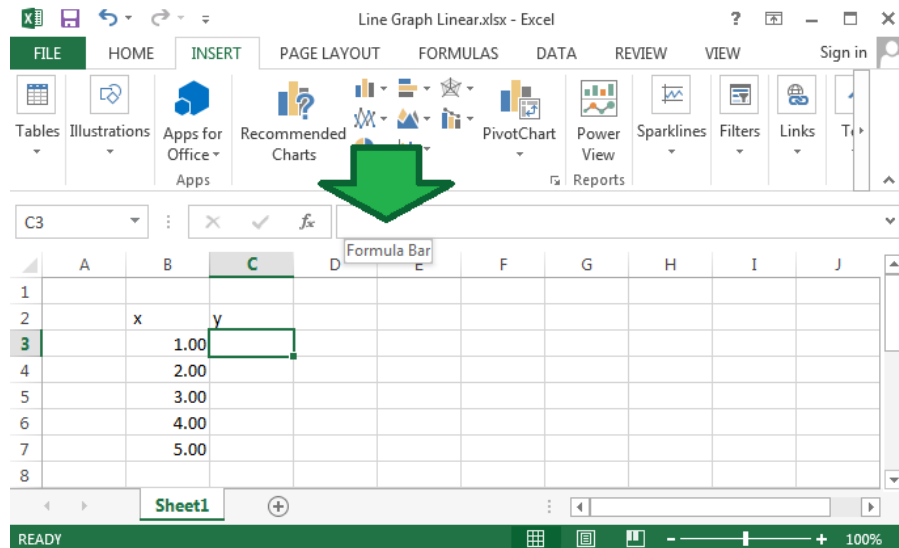
1) First, choose a set of values for x. For simplicity, use the values for x from Chapter I:

|      |
|------|
| x    |
| 1.00 |
| 2.00 |
| 3.00 |
| 4.00 |
| 5.00 |

2) Next, open a New Blank Workbook in Excel, and enter the values into the workbook (you should format the cells to get the right decimal places—see page 4):



3) Click on the first cell in the “y” column (indicated by the green box in the picture above). Then, find the *Formula Bar* (indicated by the big green arrow below), and click on it:



- 4) When entering a formula into Excel, you must begin by typing an “=” sign. If you are given the formula  $y = \frac{1}{2}x^2 + 0.1$ , you must translate it into a language (the syntax) that Excel understands:

**Your Formula:**

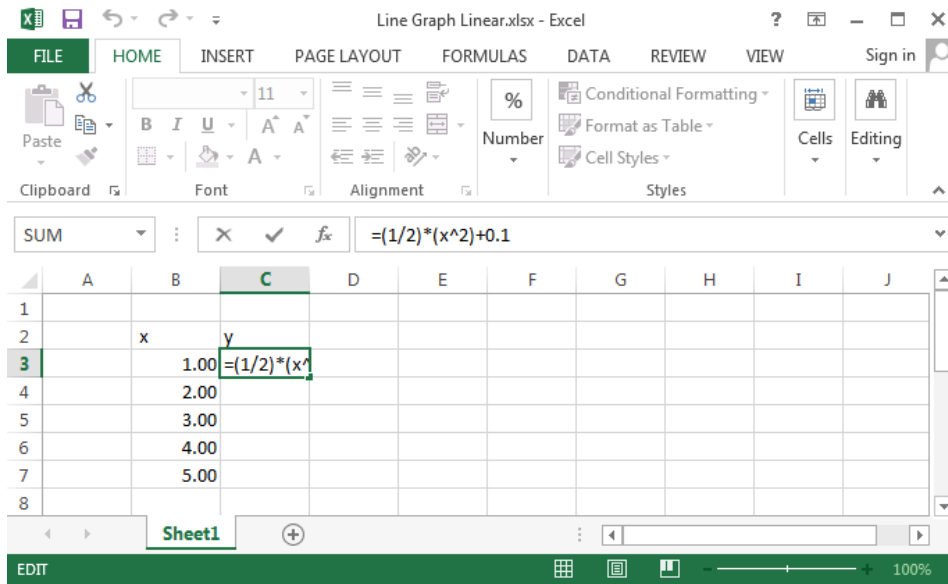
$$y = \frac{1}{2}x^2 + 0.1$$

**What You Type Into Excel’s Formula Bar:**

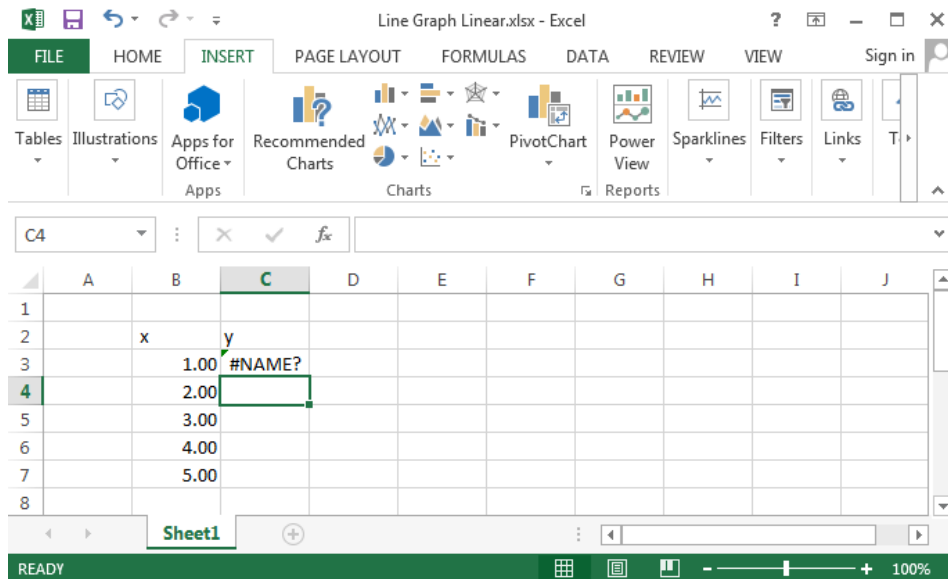
$$=(1/2)*(x^2)+0.1$$

The symbols “+”, “-”, and “/” indicate addition, subtraction, and division, respectively. Multiplication, on the other hand, is indicated by the symbol “\*” (so that  $A \times B$  is typed A\*B), and exponentiation is indicated by the symbol “^” (so that  $x^2$  is typed x^2).

When you type the formula into the formula bar, it should look like this:

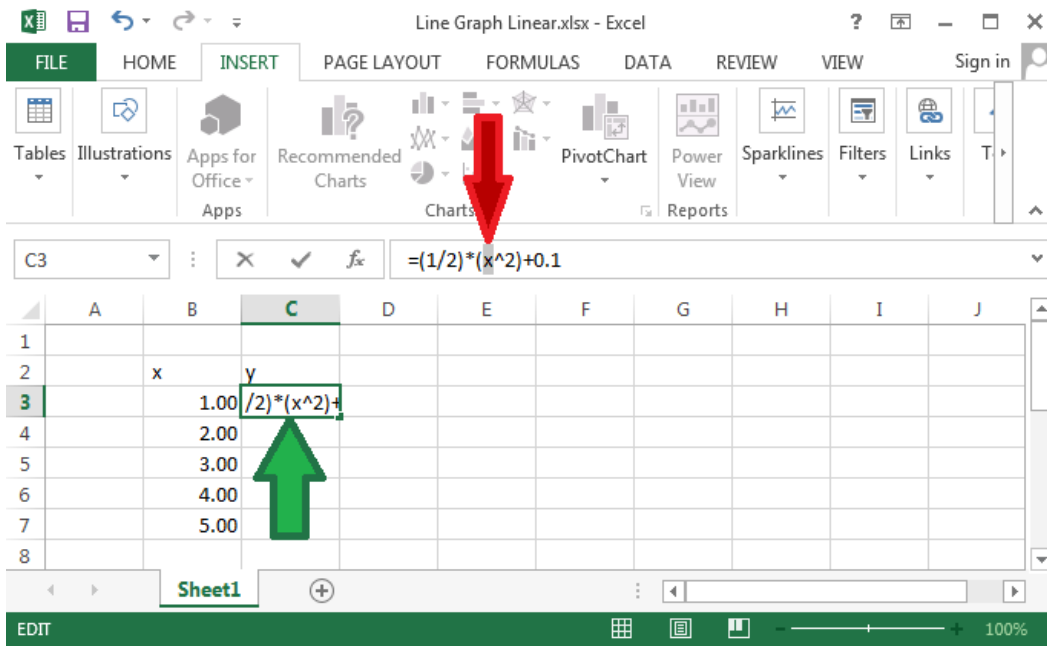


- 5) Press *Enter* (*Return* on Mac). Now your screen should look like:

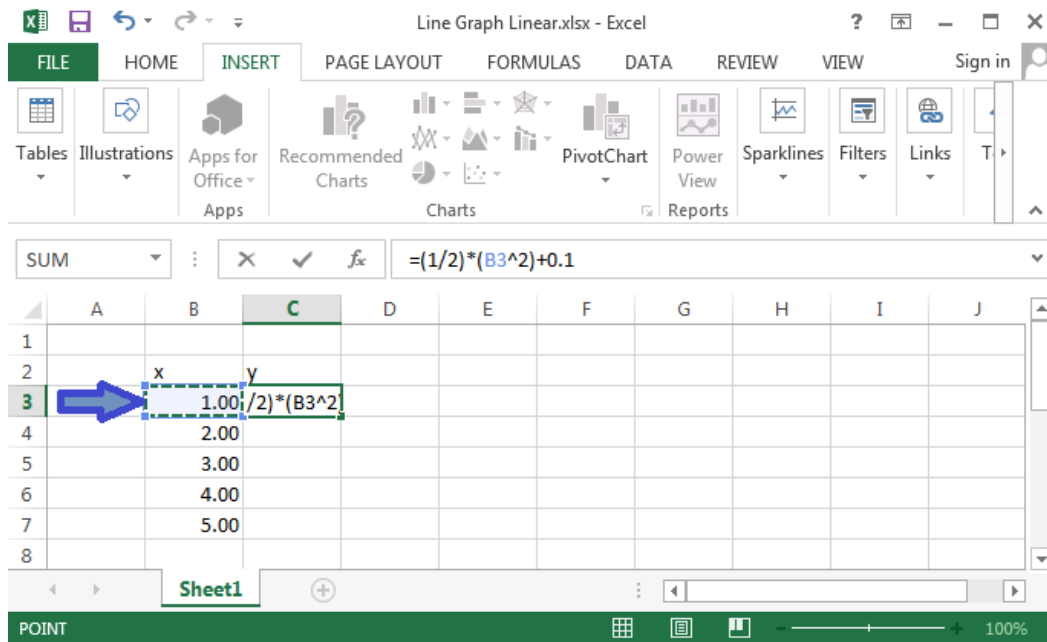


## Chapter II: Graphing Functions

- 6) There is no number in the cell, because we have not told Excel what “x” is. Click on the cell where you entered the formula (indicated by the green arrow), then highlight “x” (as indicated by the red arrow):

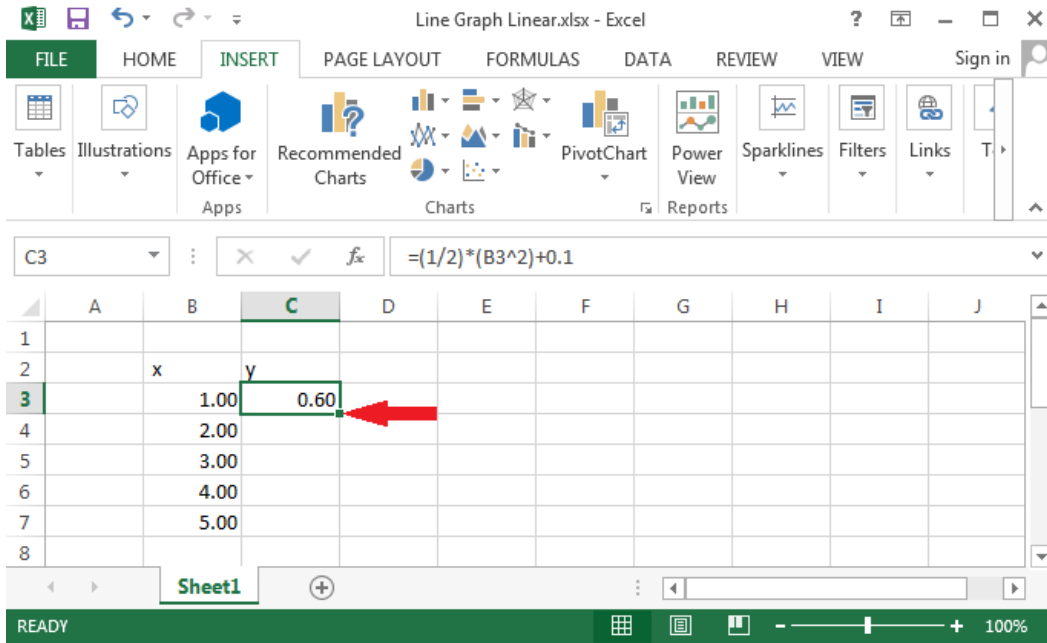


- 7) Once “x” is highlighted, click on the first value of the x-column (indicated by the blue arrow). The highlighted “x” should be replaced by the number of the cell (in this case, B3):

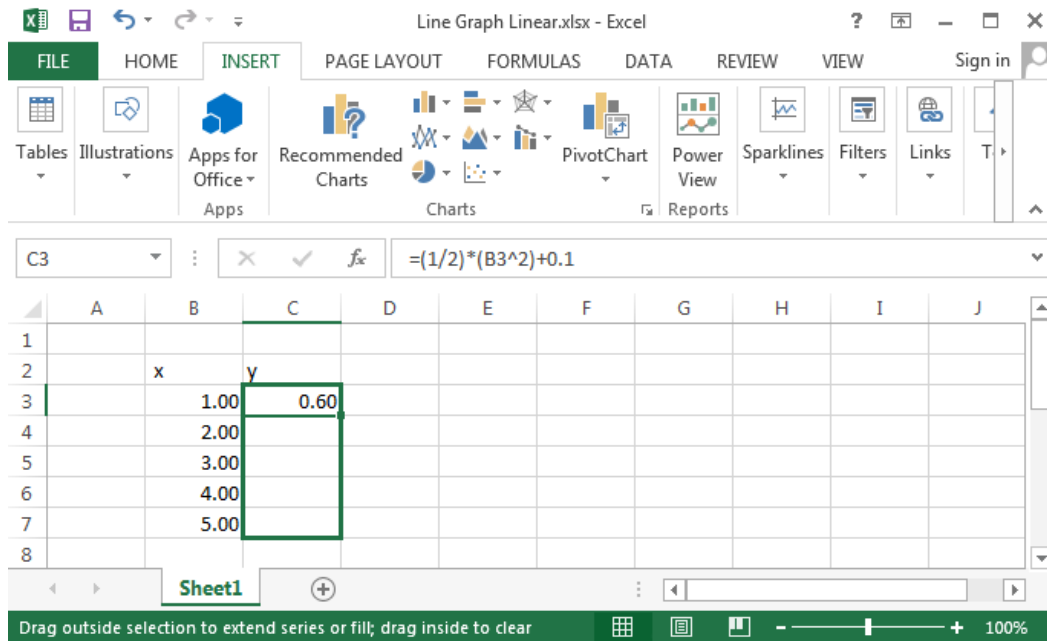


## Chapter II: Graphing Functions

- 8) Press *Enter* (*Return* on Mac). Click on the cell where you entered the formula. Click on the small green box in the lower right hand corner (indicated by the red arrow) and drag it down:



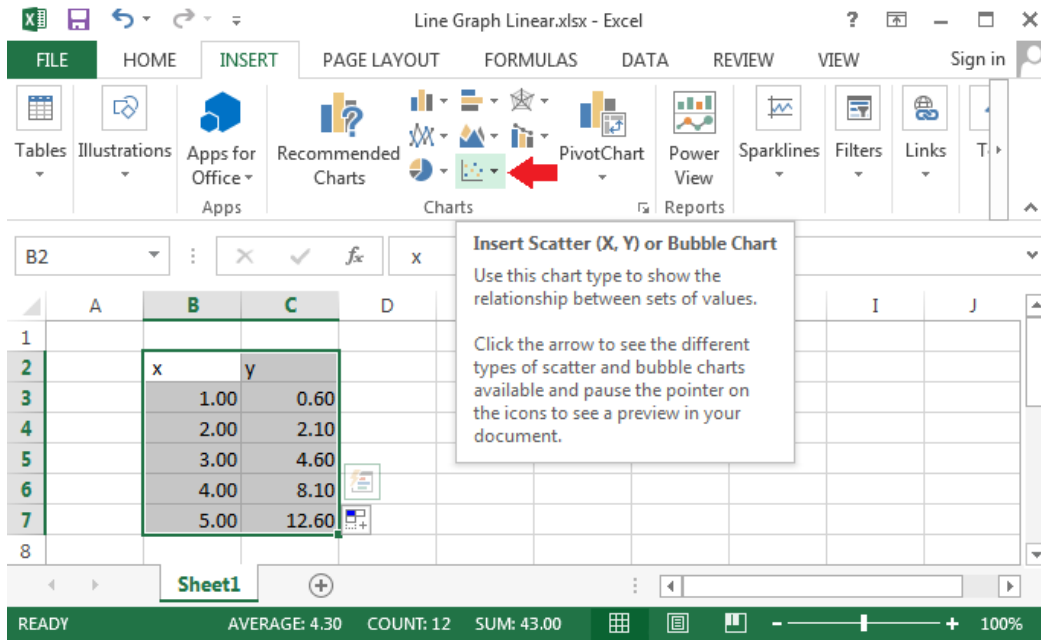
this is what it should look like when you drag the lower right corner down:



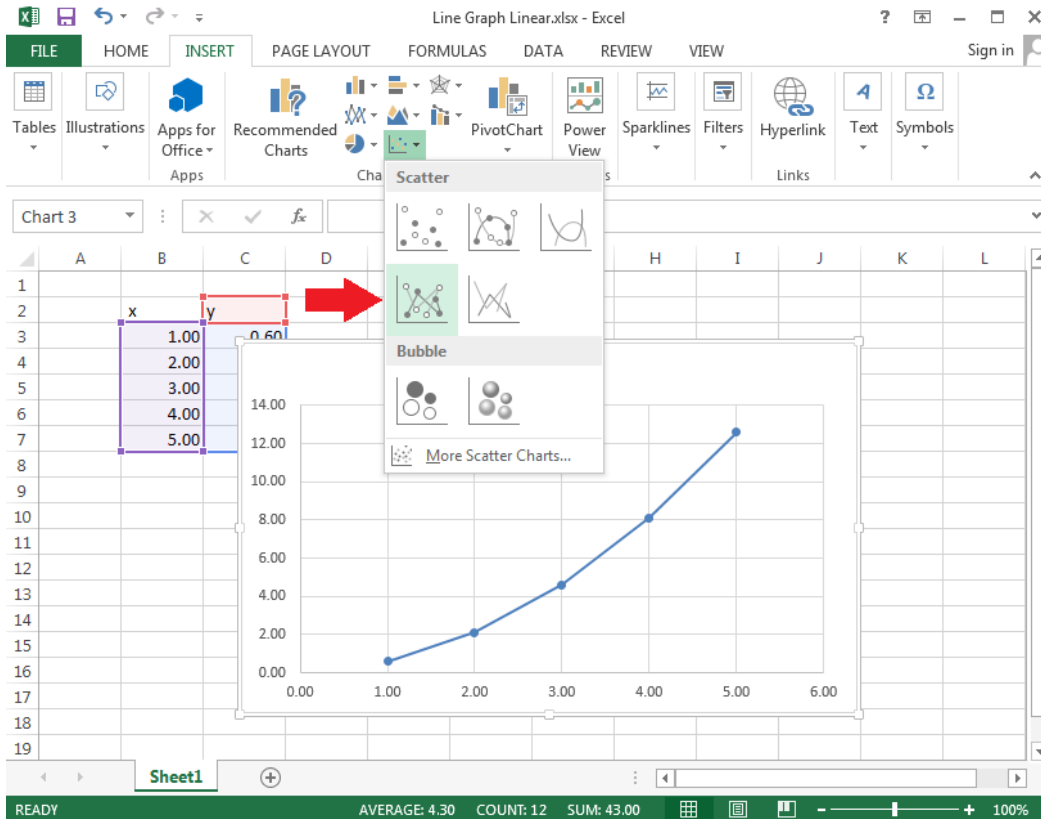
You should now have two columns of numbers, just like you did when plotting the data in Chapter I.

**Graphing the Function**

- 9) Click on the “*INSERT*” tab at the top of the window. Again, select the data and click on the “*Insert Scatter (X,Y) or Bubble Chart*” option (as indicated by the red arrow):

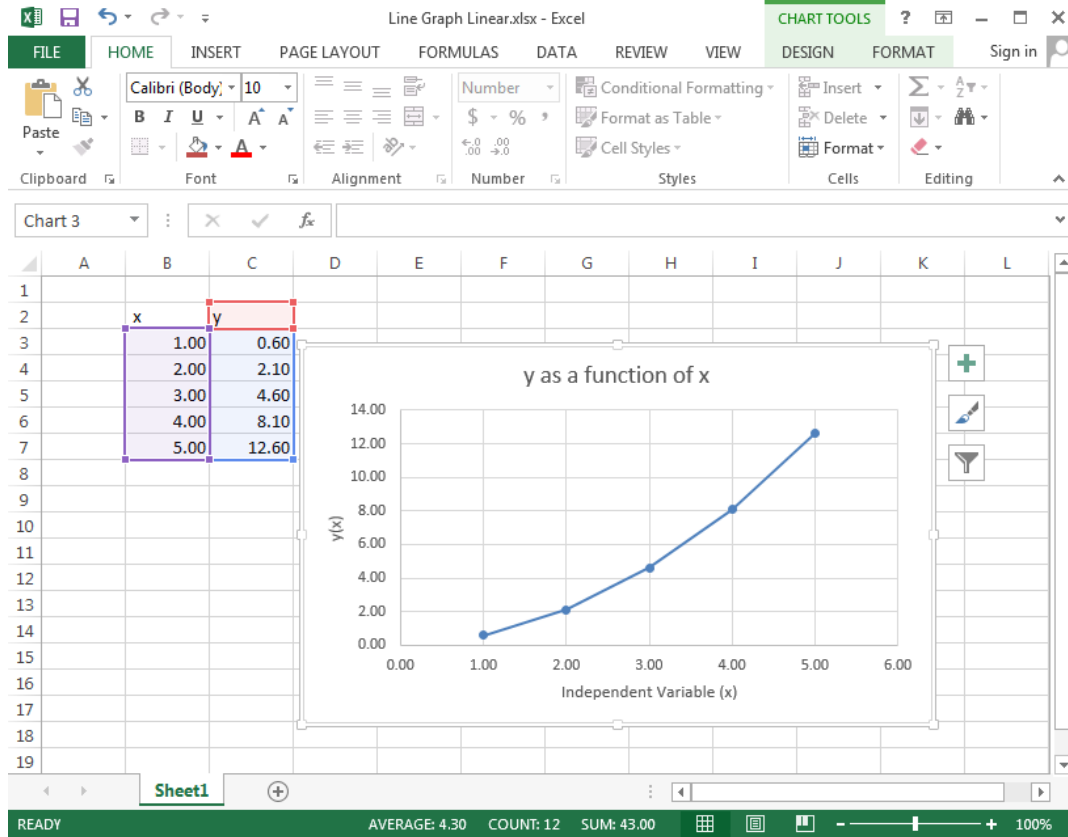


- 10) As before, make the following selection (indicated by the red arrow):

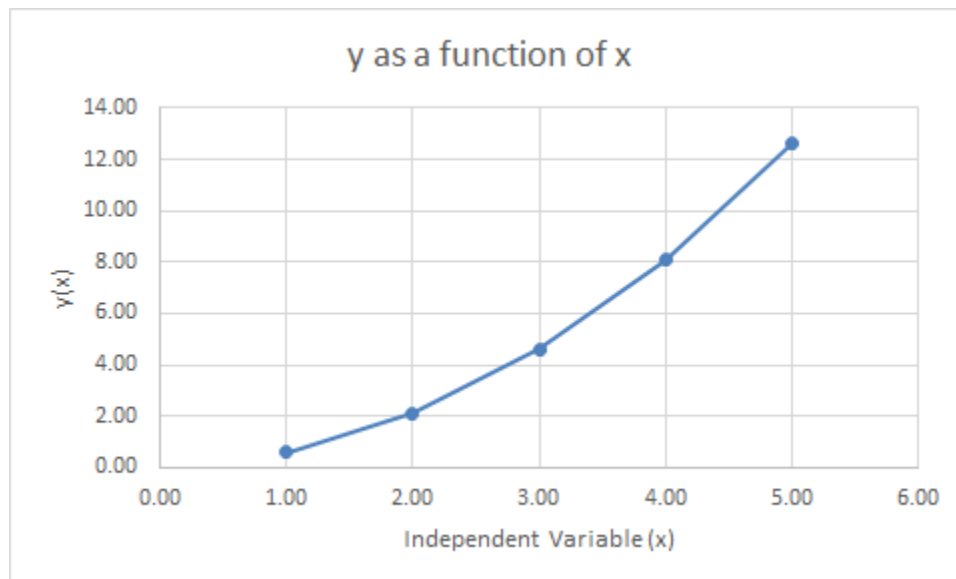


## Chapter II: Graphing Functions

11) Again, add axis titles and rename them (see the bottom of page 6 for details):



12) Your graph should look like the following:



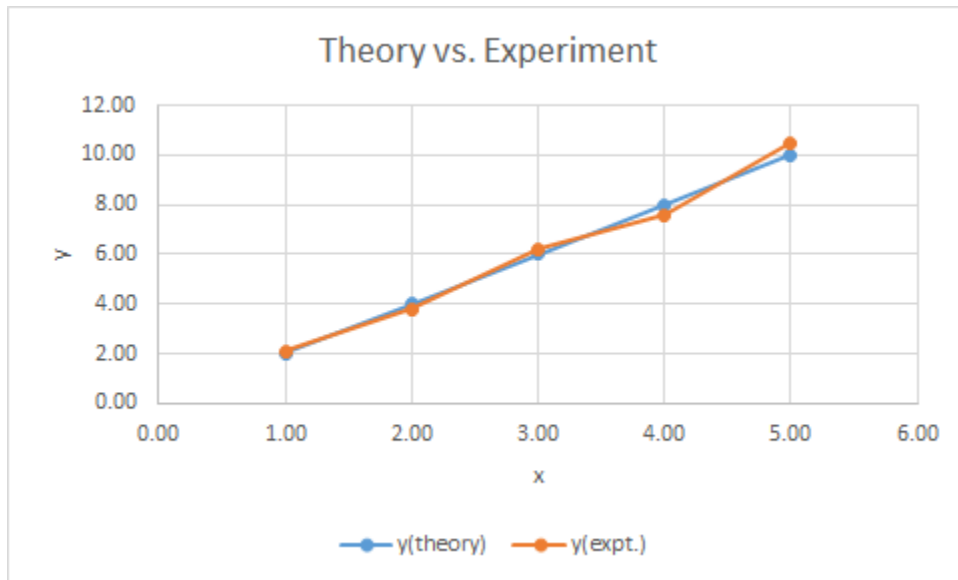
### Chapter III: Multiple Sets of Data in a Single Graph

Suppose you are given two sets of data with the same independent variable (x is the independent variable here):

| x    | y (experiment) |
|------|----------------|
| 1.00 | 2.10           |
| 2.00 | 3.80           |
| 3.00 | 6.20           |
| 4.00 | 7.60           |
| 5.00 | 10.50          |

| x    | y (theory) |
|------|------------|
| 1.00 | 2.00       |
| 2.00 | 4.00       |
| 3.00 | 6.00       |
| 4.00 | 8.00       |
| 5.00 | 10.00      |

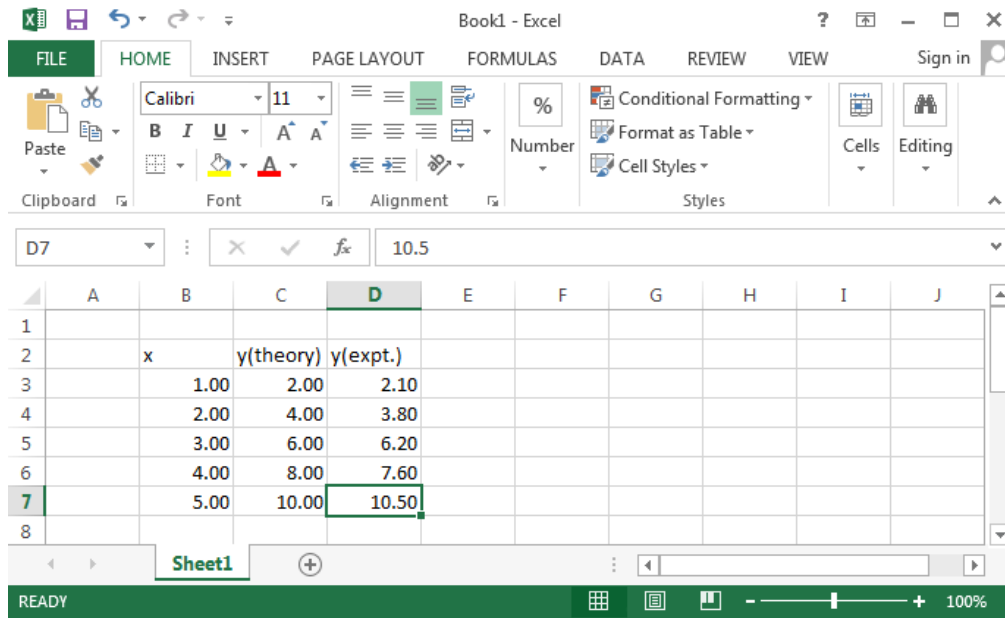
This chapter will teach you how to take the two sets of data above and turn it into this graph:





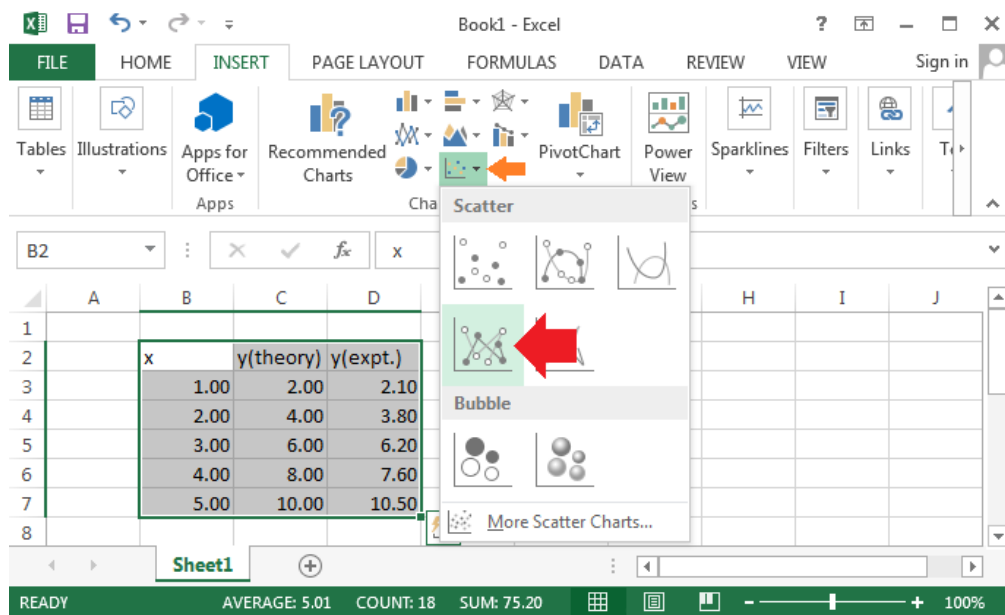
### Entering Data

- 1) Open a New Blank Workbook in Excel, and enter the values into the workbook (again, format the cells to get the right decimal places—see page 4):



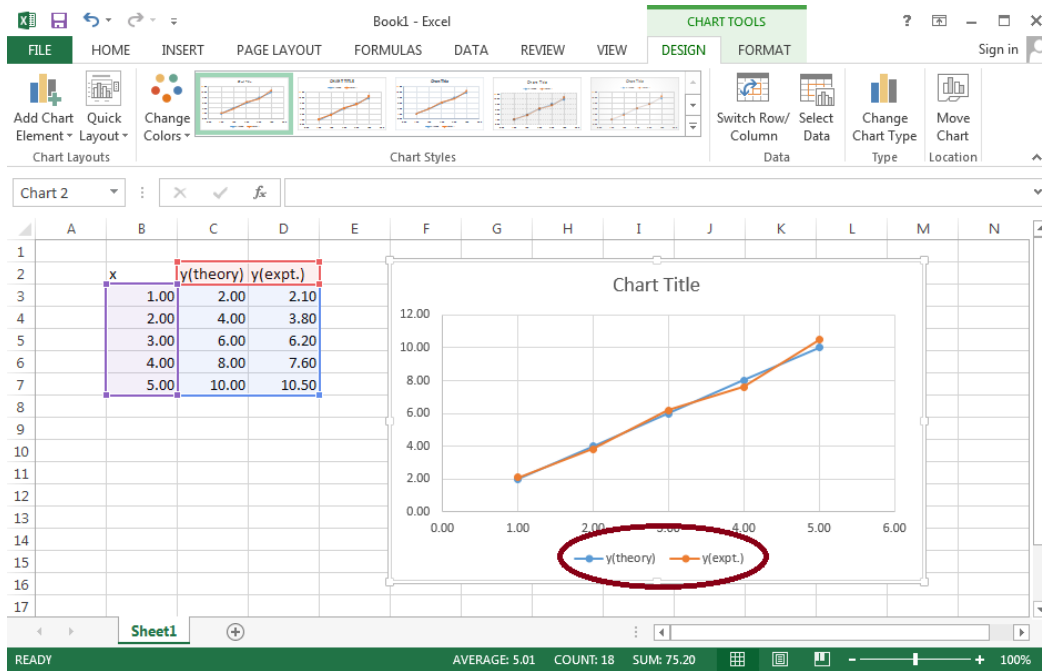
*If you wish, you may resize the columns by clicking the lines in between the column titles (labeled by A, B, C, D,...) at the top of the spreadsheet. By the way, “expt.” is a common abbreviation for “experiment.”*

- 2) Select the data (make sure to include the row containing the labels “x”, “y (theory)”, and “y(expt.)”), click the insert tab, and pick the following options (indicated by the yellow & red arrows):



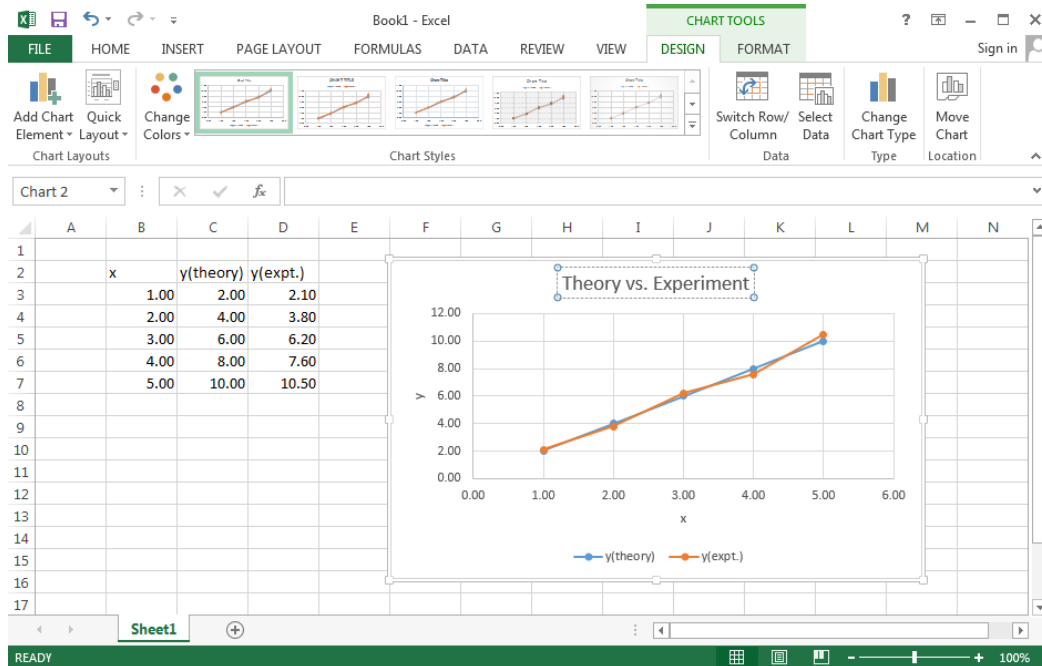
### Chapter III: Multiple Sets of Data in a Single Graph

Your screen should now look like (with the exception of the maroon circle):



The legend is circled in maroon. This tells you which line corresponds to which column. This is why it is important to select the column labels, as instructed earlier.

- 3) Finally, add axis titles, rename them, and rename the graph title (see the bottom of page 6 for details):



4) Your graph should now look like:

