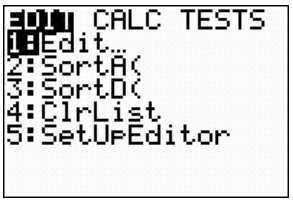
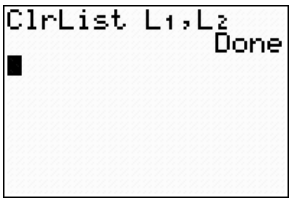
Entering and Graphing the Data

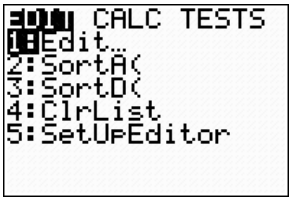
1. Turn the calculator on.
   Press [STAT] .



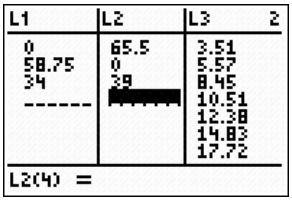
To clear list 1 and list 2, press [2nd] [1] [,] [2nd] [2] [ENTER].



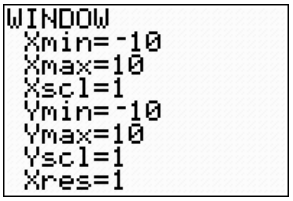
2. Press [STAT] [1]



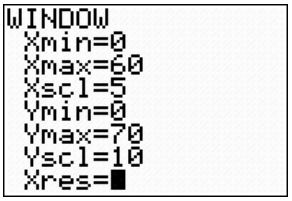
Press [0] [▼] [▶] [6] [5] [.] [5] [▼] [◀] [5] [8] [.] [7] [5] [▼] [▶] [0] [▼] [◀] [3] [4] [▼] [▶] [3] [9] [▼]
To enter the data



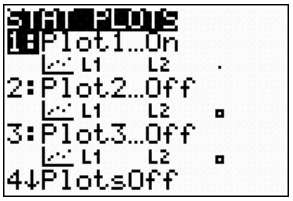
3. Press [WINDOW]



Press [0] [ENTER] [5] [0] [ENTER] [5] [ENTER] [0] [ENTER] [7] [0] [ENTER] [1] [0]
To enter window settings

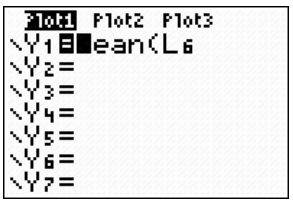


4. Press [2nd] [Y=]

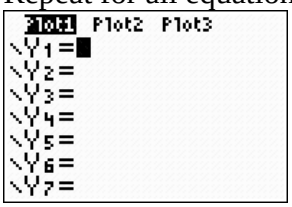


Press [1] [◀] [ENTER] [▼] [ENTER] [▼] [2nd] [1] [▼] [2nd] [2] [▼] [ENTER]
To switch on statplots

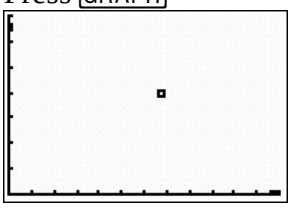
5. Press [Y=]



Press [CLEAR]
To clear equations
Repeat for all equations in Y=

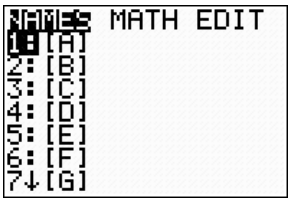


6. Press GRAPH

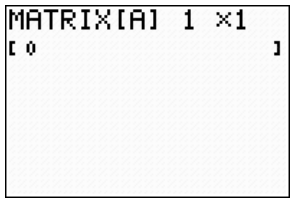


Finding the Model Using Matrices

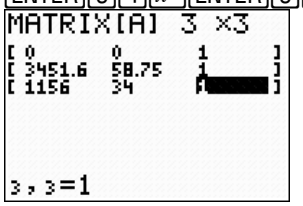
1. Press 2nd x^{-1}



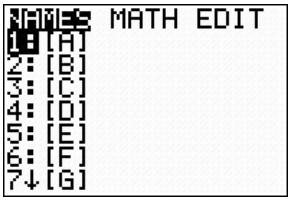
Press ▶ ▶ 1
To Edit [A]



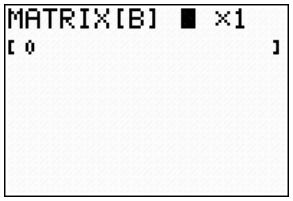
Press 3 ENTER 3 ENTER
0 ENTER 0 ENTER 1 ENTER
5 8 . 7 5 x^2 ENTER 5 8 . 7 5 ENTER 1
ENTER 3 4 x^2 ENTER 3 4 ENTER 1



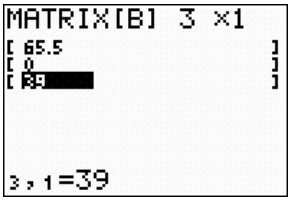
2. Press 2nd x^{-1}



Press ▶ ▶ 2
To Edit [B]

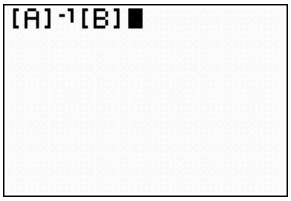


Press 3 ENTER 1 ENTER
6 5 . 5 ENTER 0 ENTER 3 9 ENTER

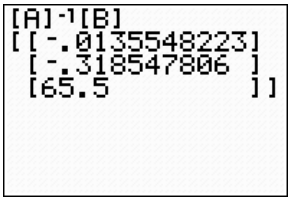


3. Press MODE
To go to the Home screen
Press CLEAR
To Clear the Home Screen

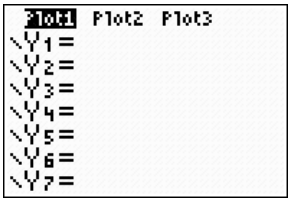
Press 2nd x^{-1} 1 x^{-1}
Press 2nd x^{-1} 2



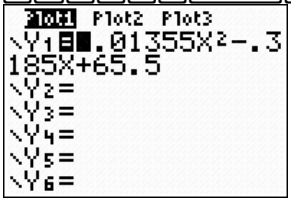
Press ENTER



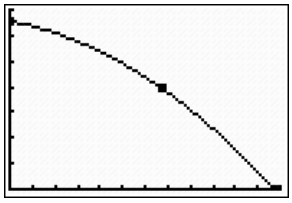
4. Press Y=



Press (-) . 0 1 3 5 5 X,T,Θ,*n* x^2
− . 3 1 8 7 X,T,Θ,*n* + 6 5 . 5

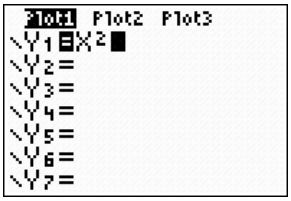


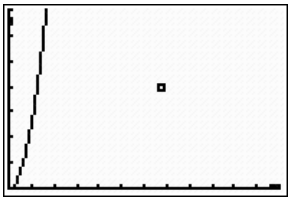
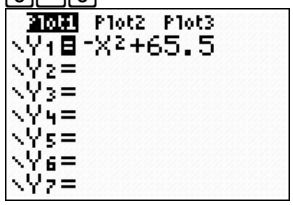
Press GRAPH

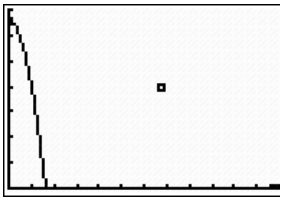


Finding the Model Using Transformations of $y = x^2$

1. Press [Y=][X,T,Θ,n][x^2] Press [GRAPH] Press [Y=][(-)][X,T,Θ,n][x^2][+][6][5][.][5] Press [GRAPH]

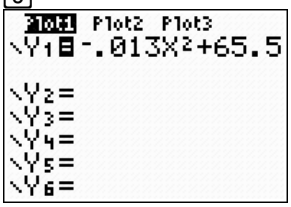


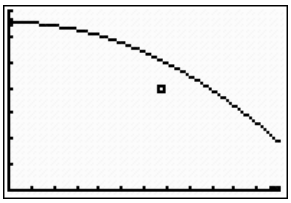
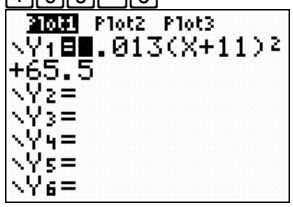



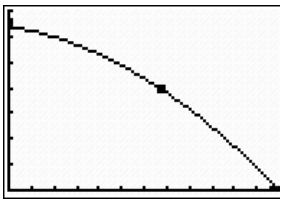


This process may take many repetitive steps to make the necessary transformations for the model to fit the data. The process has been shortened for this tutorial.

2. Press [Y=][(-)][.][0][1][3][X,T,Θ,n][x^2][+][6][5][.][5] Press [GRAPH] Press [Y=][(-)][.][0][1][3][(][X,T,Θ,n][+][1][1][)][x^2][+][6][5][.][5] Press [GRAPH]

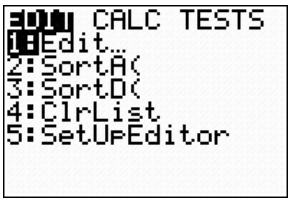


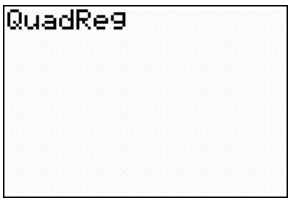



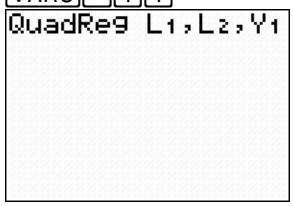


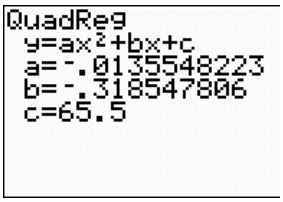
Finding the Model Using Regression

1. Press [STAT] Press [▶][5] Press [2nd][1][,][2nd][2][,][VARS][▶][1][1] Press [ENTER]

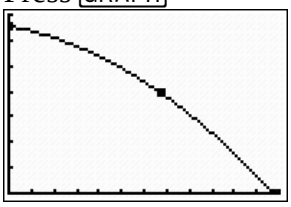






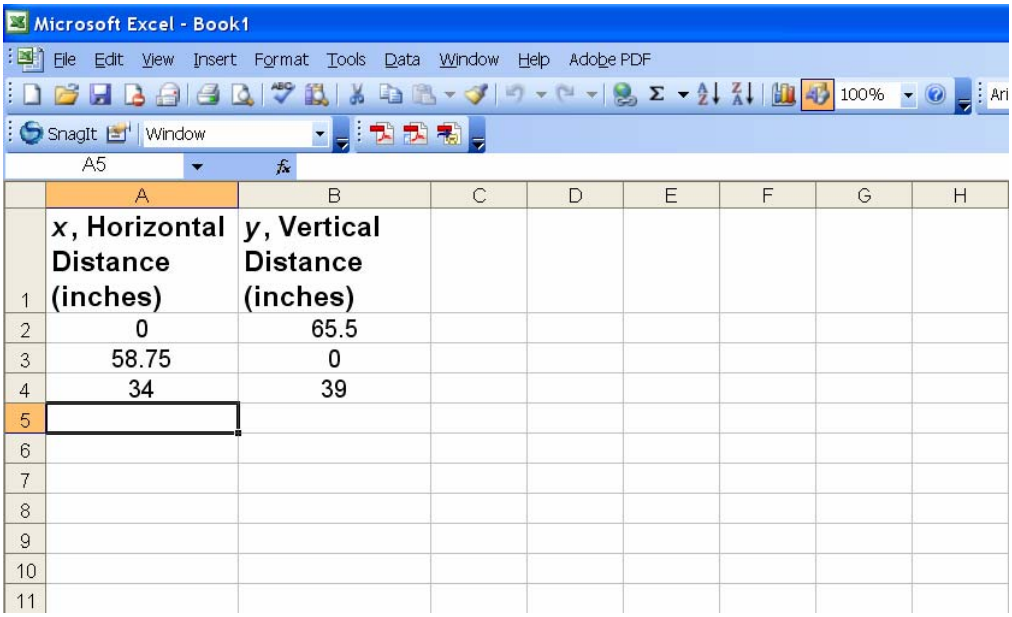


2. Press [GRAPH]

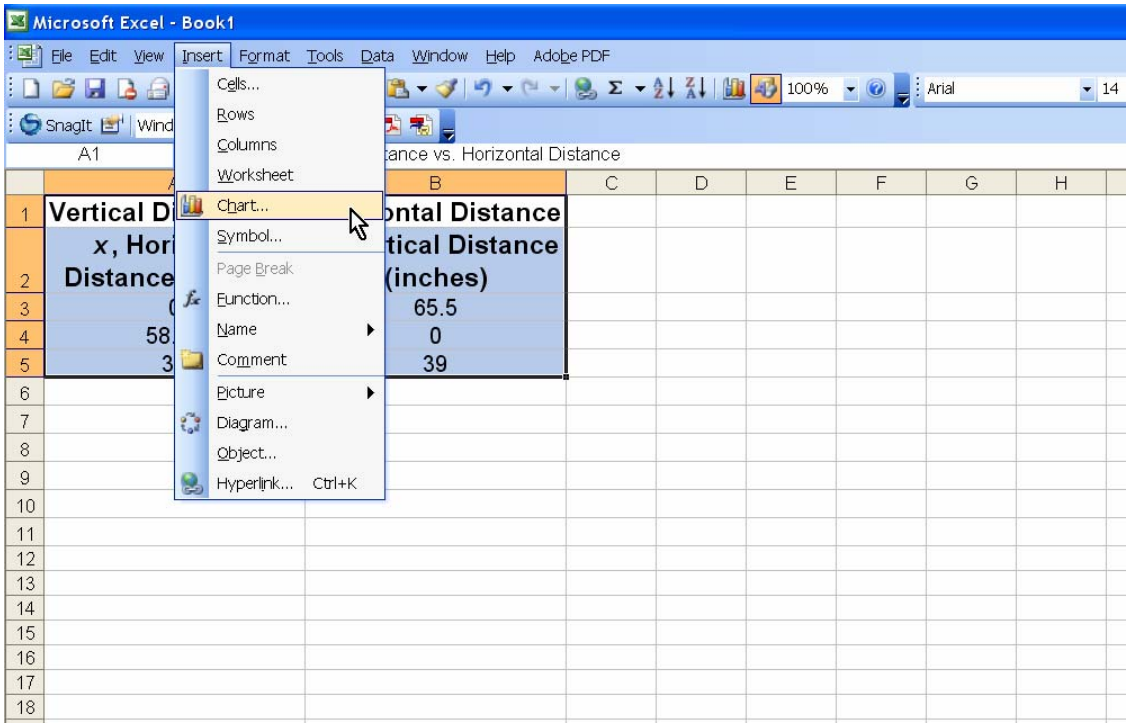


Finding the Model Using Microsoft Excel

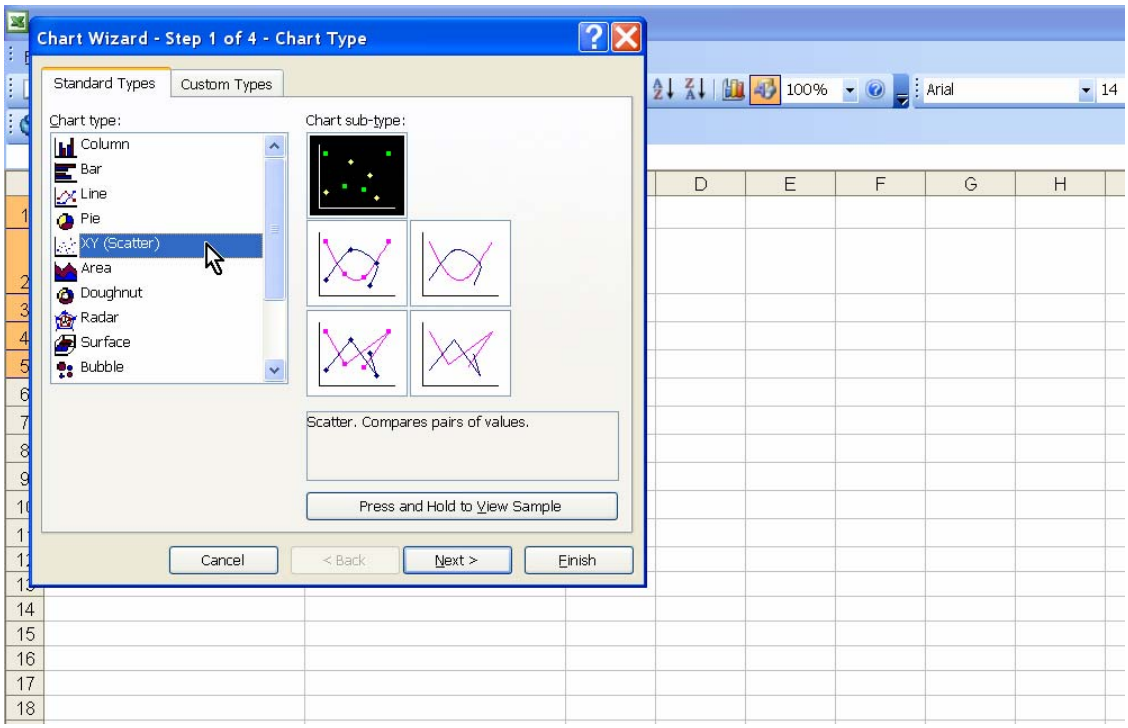
1. Enter column headings and data into the spreadsheet.



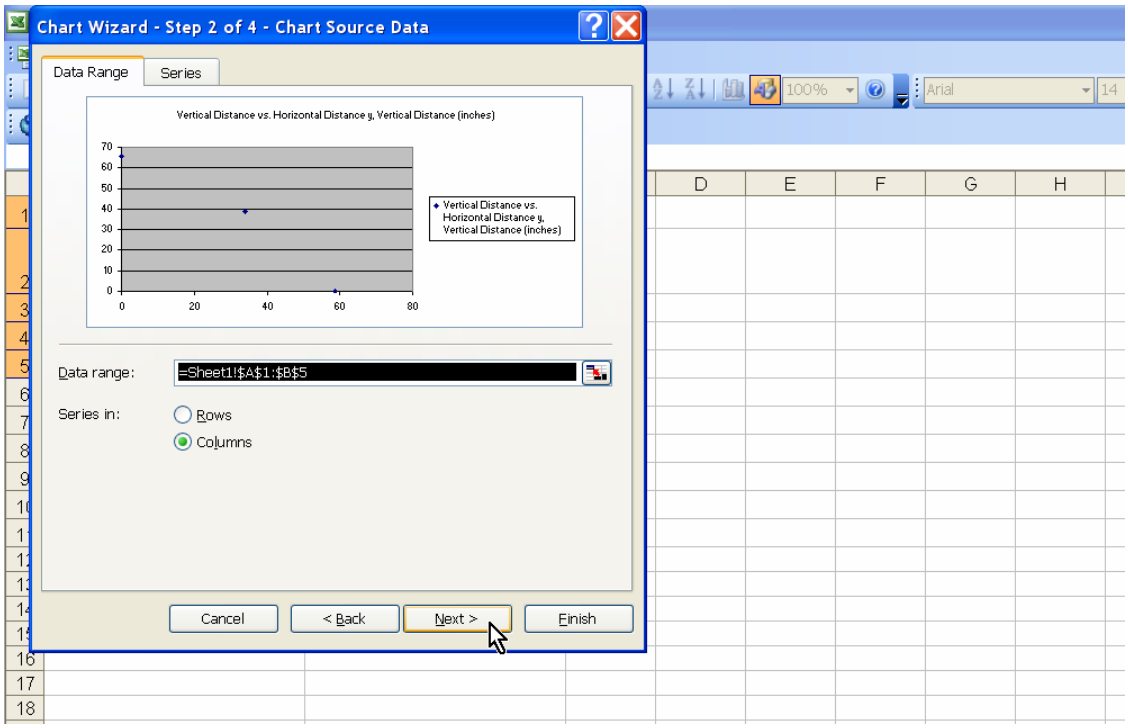
2. Select the data by clicking in the first cell, holding down shift and clicking in the last cell. Next choose **Chart** from the **Insert** menu.



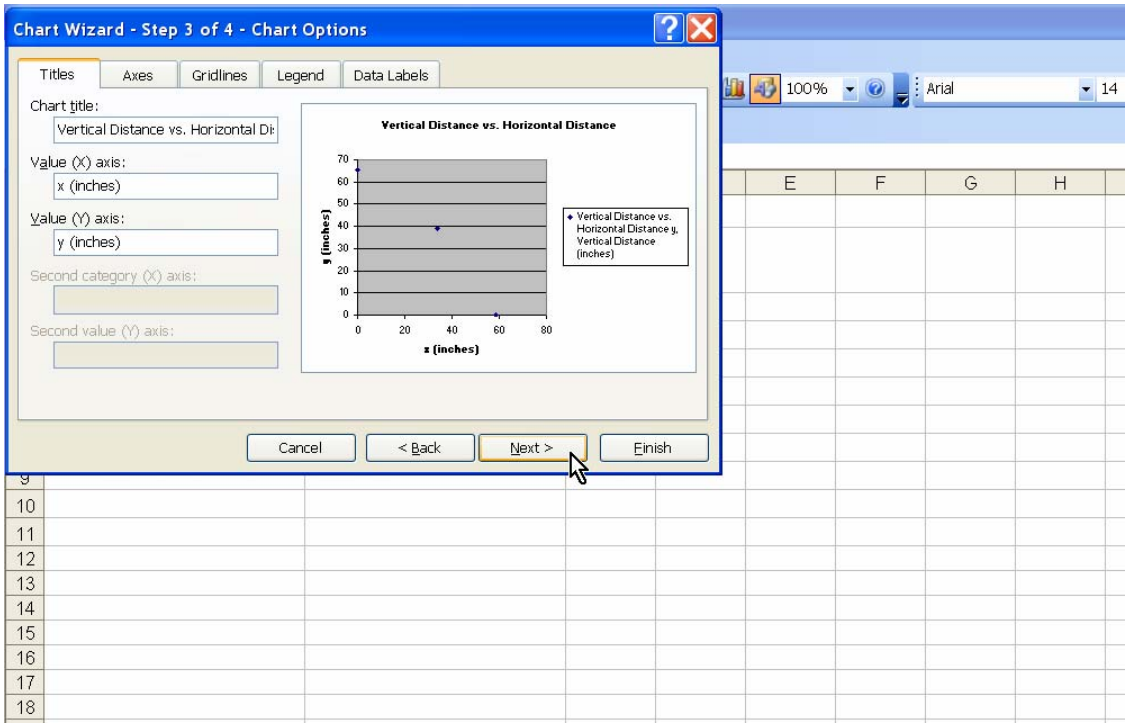
3. Select **XY (Scatter)** then click **Next**.



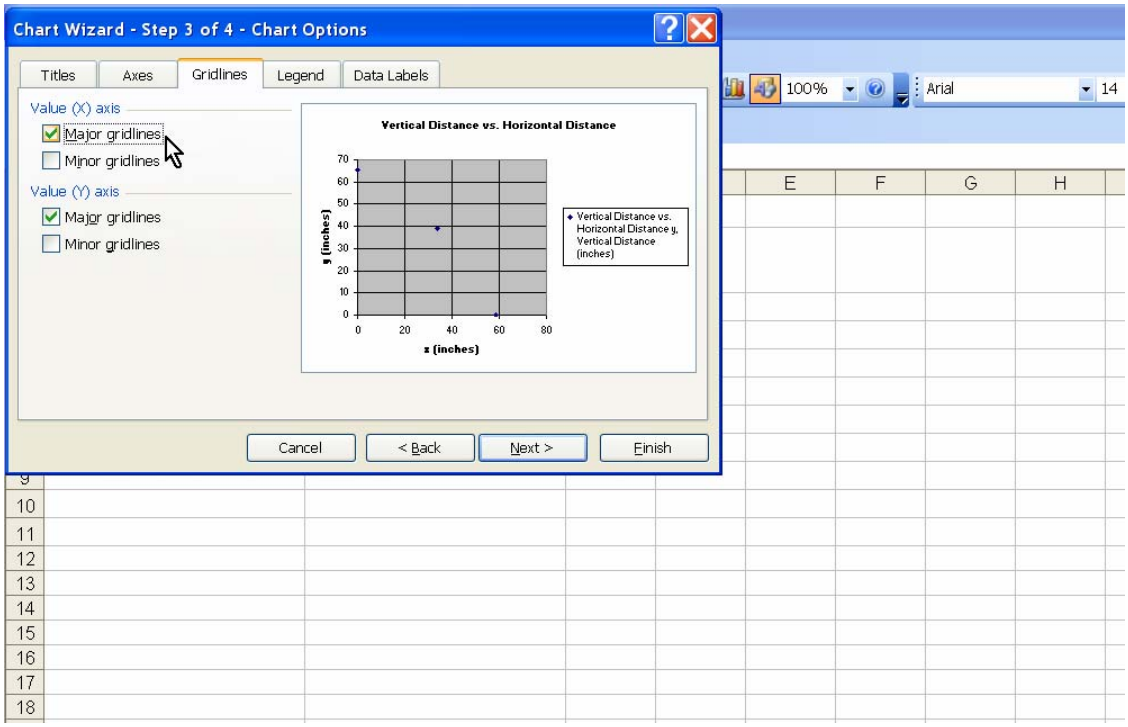
4. Click **Next**.



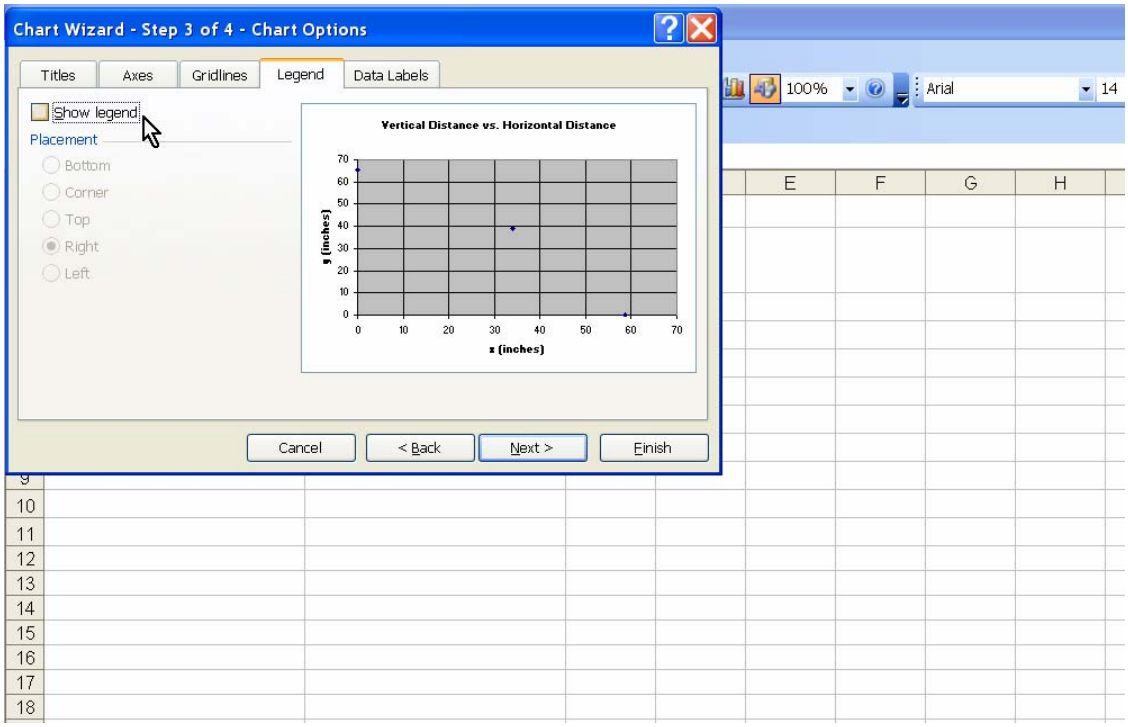
5. Click on the **Titles** tab and enter labels for the *Chart title*, the *Value (X) axis*, and the *Value (Y) axis*.



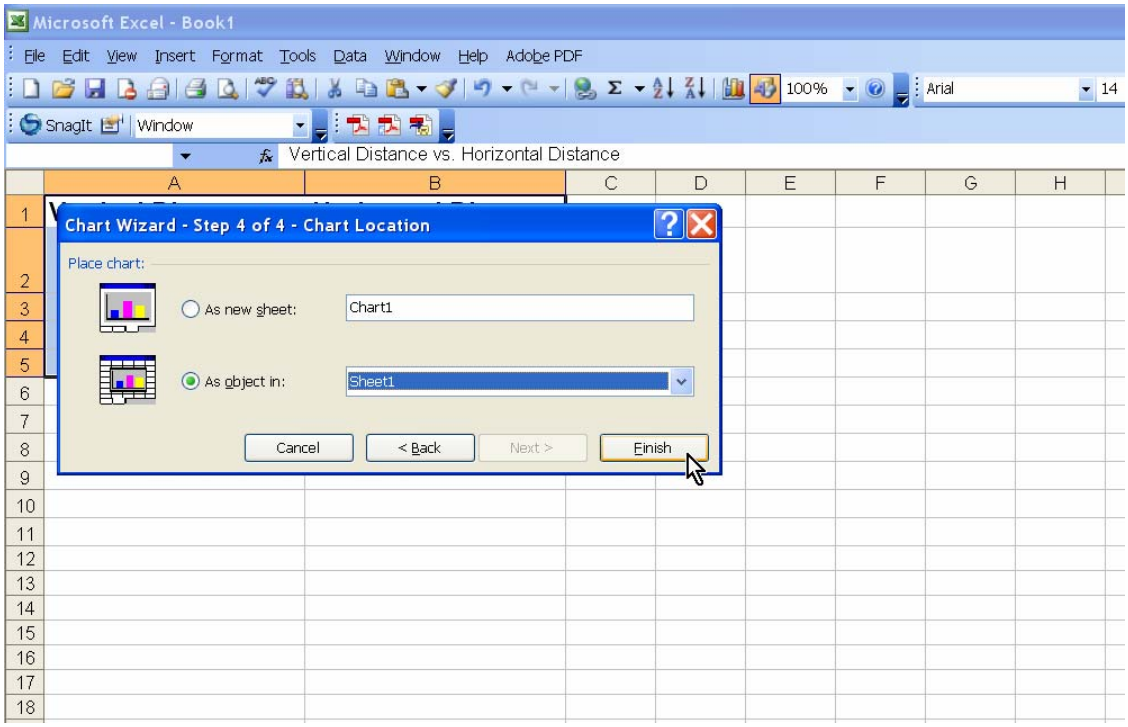
6. Click on the **Gridlines** tab and select the **Major gridlines** under **Value (X) axis**.



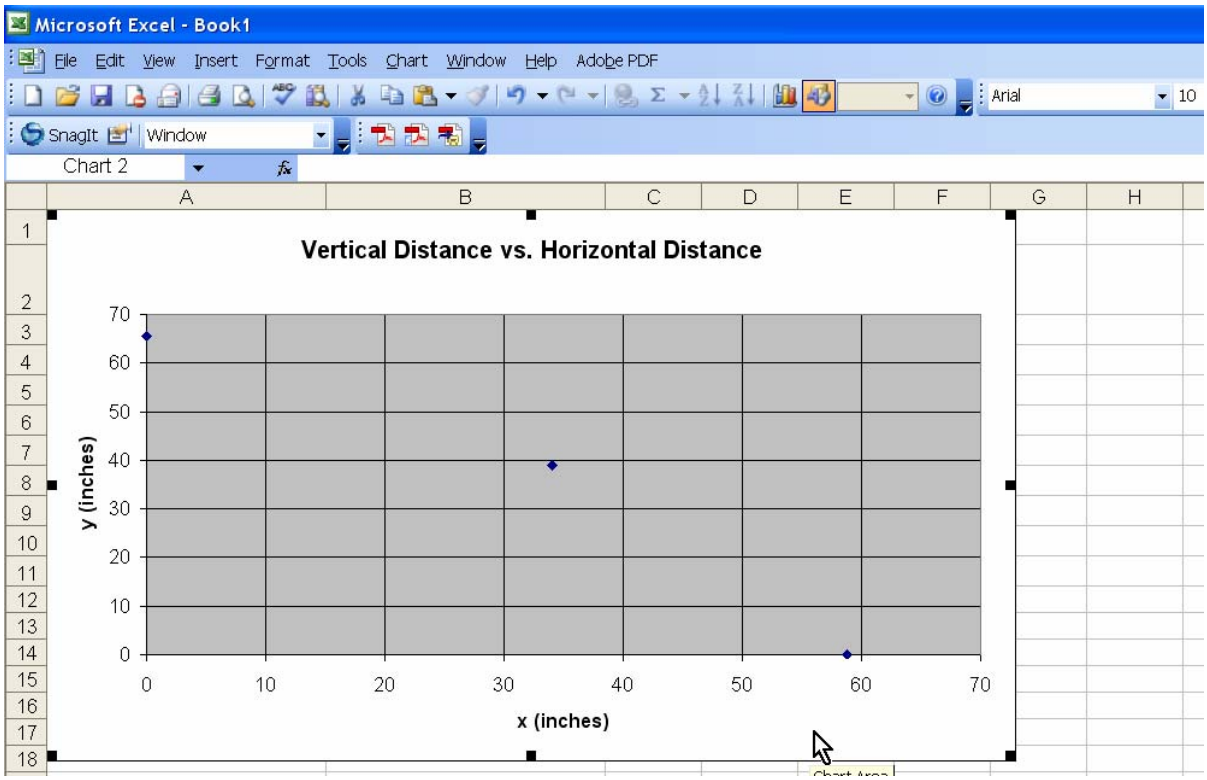
7. Click on the **Legend** tab and deselect **Show legend** then click **Next**.



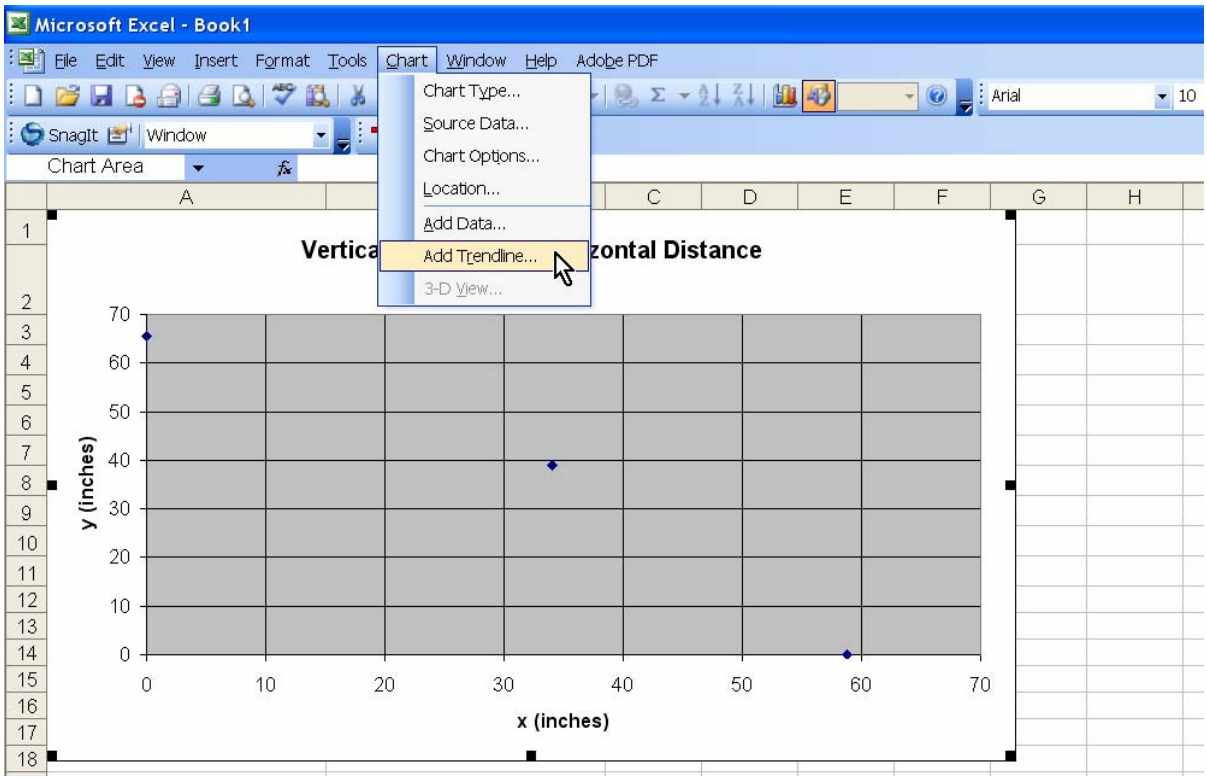
8. Click **Finish**.



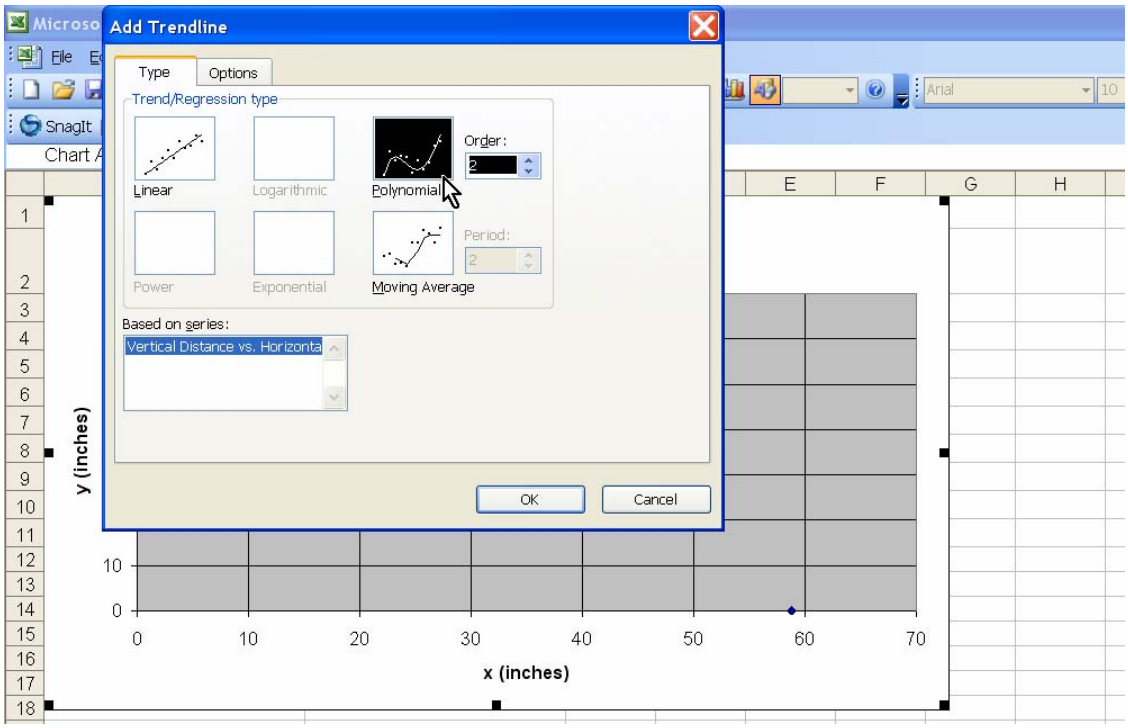
9. Select the chart by clicking on its outer border.



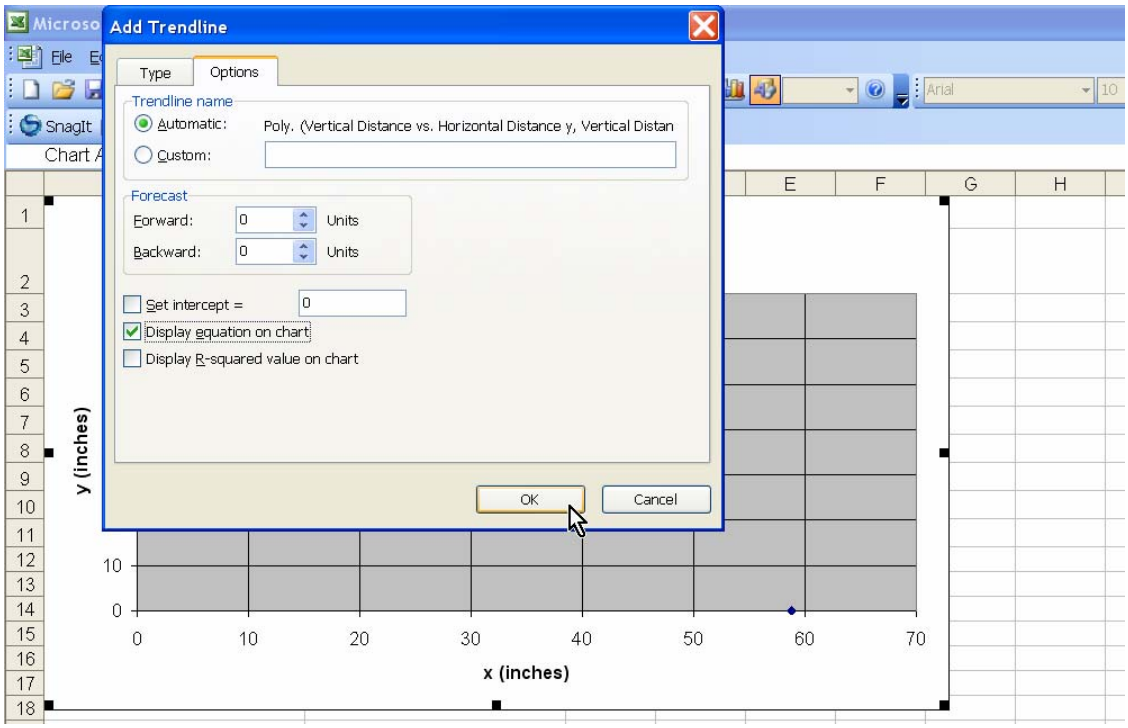
10. Choose **Add Trendline** from the **Chart** menu.

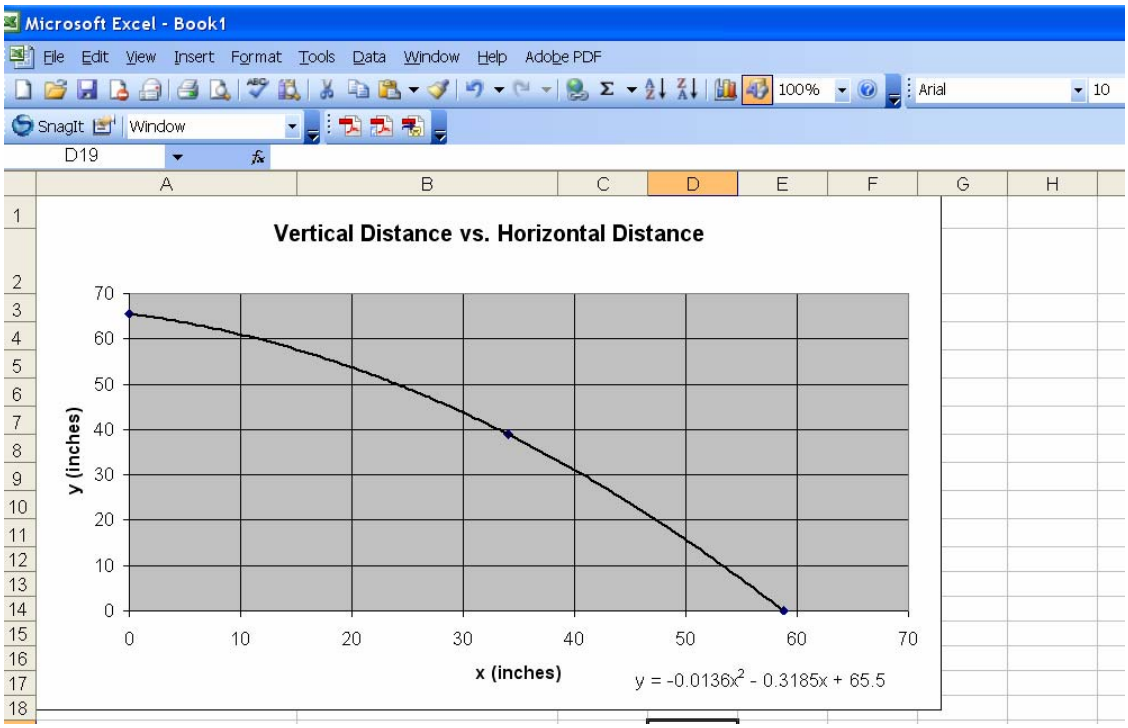


11. Select **Polynomial** and set the **Order** to 2 then click the **Options** tab.



12. Select the **Display equation on chart** check box then click **OK**.

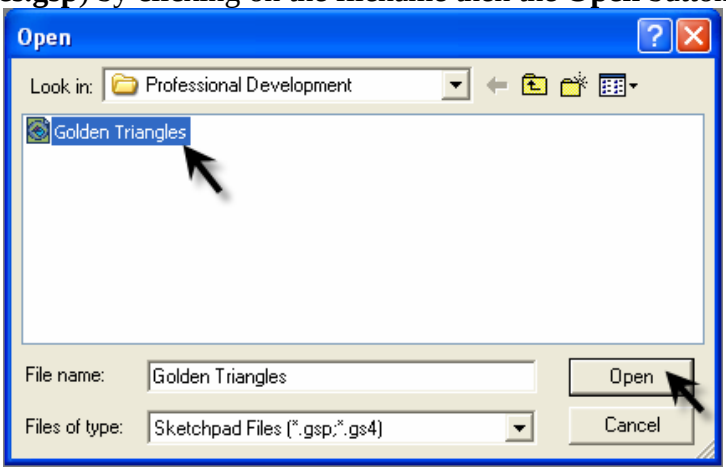



Microsoft Excel - Book1
File Edit View Insert Format Tools Data Window Help Adobe PDF
SnagIt Window
D19
Vertical Distance vs. Horizontal Distance
y (inches)
x (inches)
0 10 20 30 40 50 60 70
y = -0.0136x2 - 0.3185x + 65.5

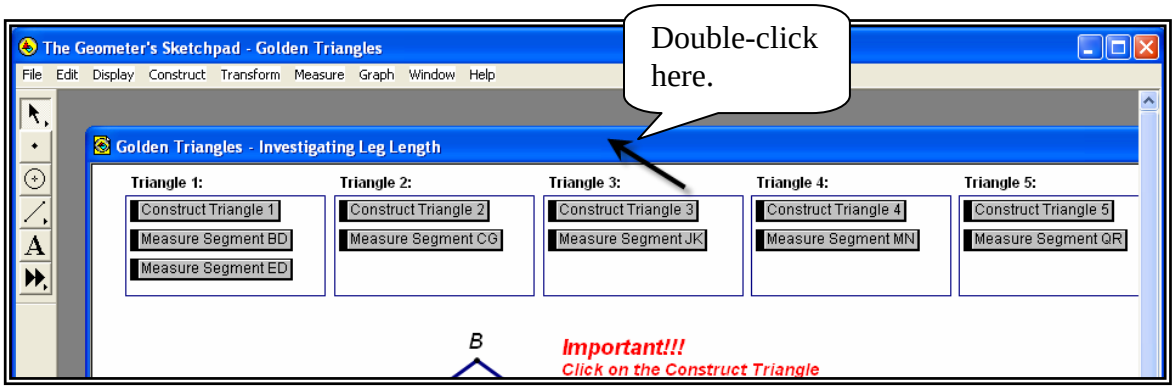
Opening a Sketch in Geometer's Sketchpad

1. To *open* an existing sketch in Geometer's Sketchpad, select **Open** from the **File** menu.

2. A pop up window will appear. Follow the directions for your particular computer system to get to the file where the existing sketches are stored. Select the desired file (in this case, **Golden Triangles.gsp**) by clicking on the filename then the **Open** button.



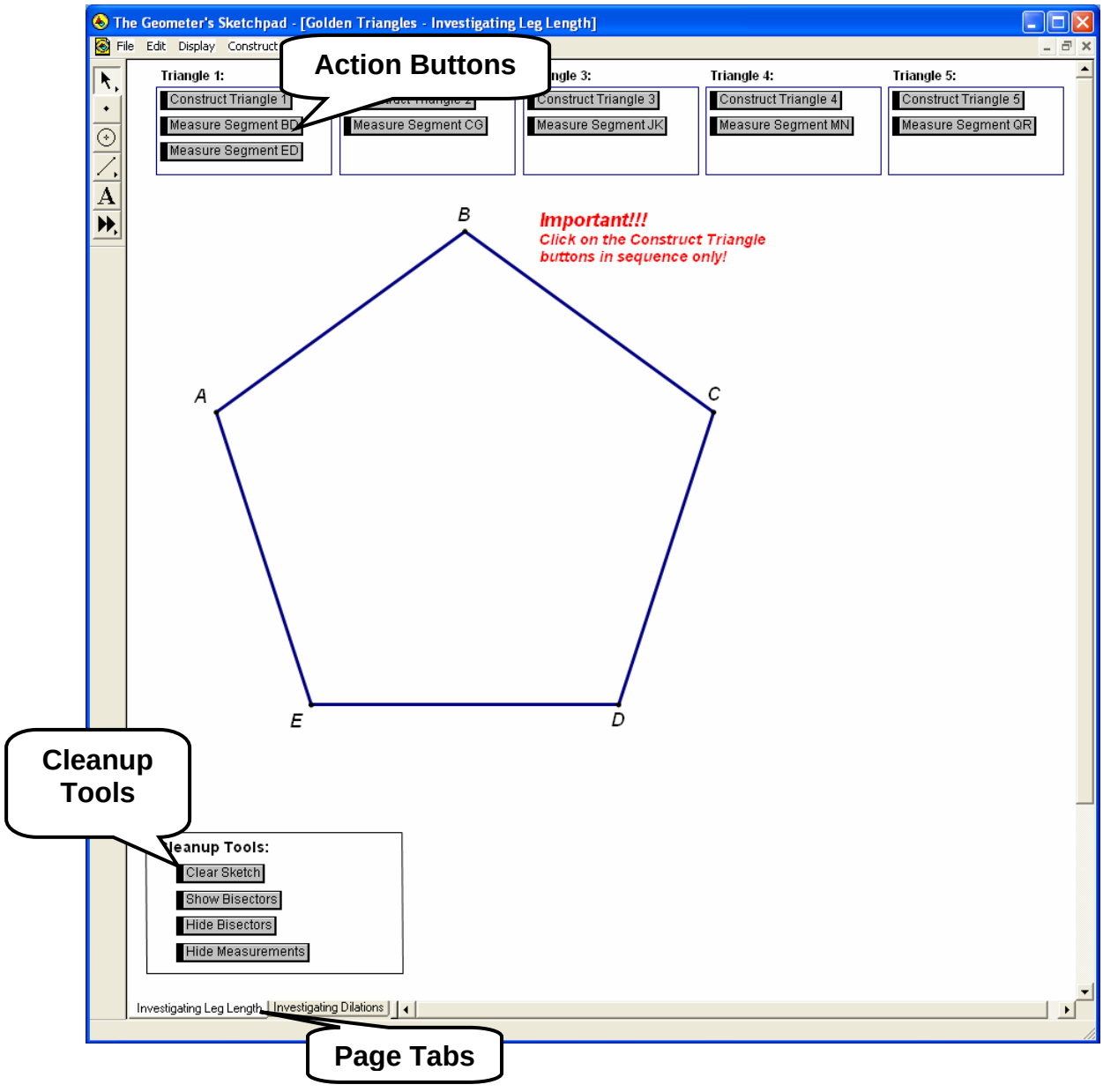
The sketch will open in its own window which you can manipulate like all other windows in Microsoft Windows. To maximize the window, you can double-click on the menu bar at the top of the window.



Working with the "Golden Triangles" sketch:

To work with the "Golden Triangles" sketch, you do not need to be familiar with how to use the Geometer's Sketchpad software. Some features that you may need to know about are:

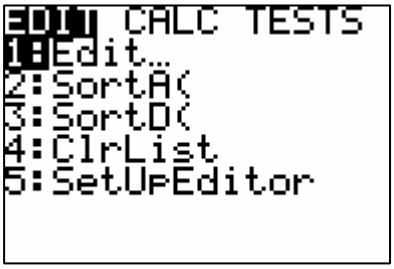
- **Action buttons** are buttons you can click on that cause a particular action to happen. In this sketch, buttons will either construct the next triangle in the sequence or measure a segment length.
- **Cleanup tools** are action buttons that cause certain parts of the sketch to disappear, thus "cleaning up" the sketch.
- **Page tabs** are divider tabs that separate different pages in the sketch. In this sketch, there are two pages: Investigating Leg Length and Investigating Dilations.



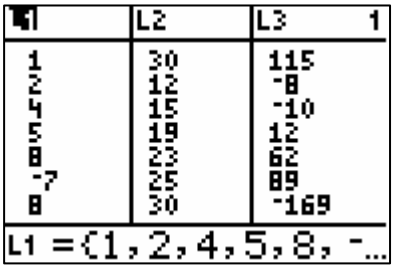
Part 1: Investigating Leg Length

Generating a Scatterplot of Leg Length vs. Triangle Number Using a Graphing Calculator

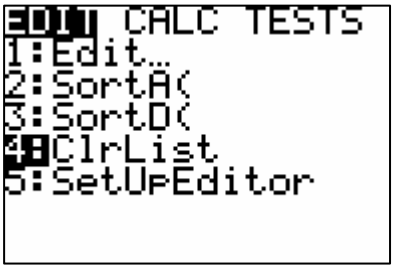
1. Press [STAT]. Then press [ENTER].



2. You will see a table containing lists. Your calculator may contain data in its lists from a previous investigation. If the lists do not contain previous data, you may skip to step 6.

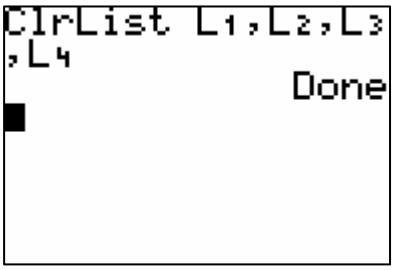


3. To clear this previous data, press [STAT].

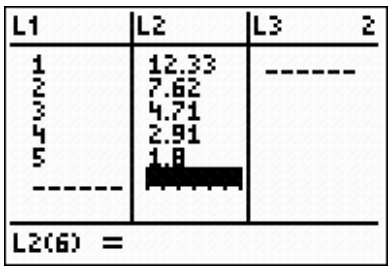


4. Highlight **ClrList**. Enter the lists that you wish to clear. Press [ENTER].

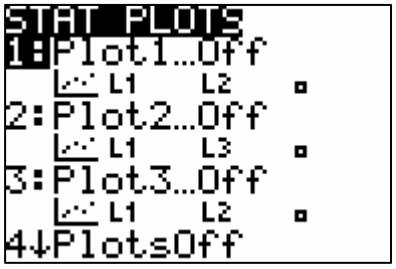
5. Press [ENTER] again.



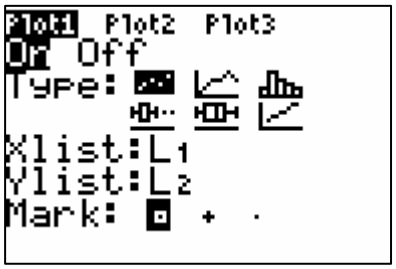
6. Enter the data into the lists.
   Be sure to press [ENTER] after each value.



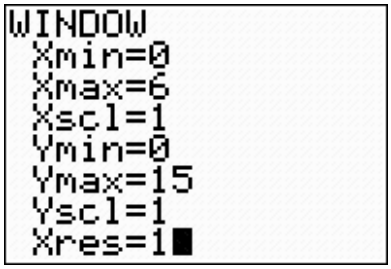
7. Press [2nd] [STAT PLOT].



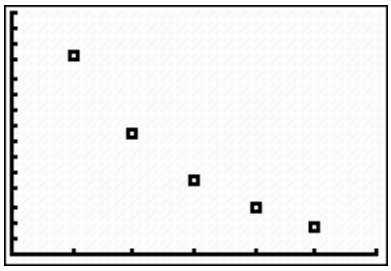
8. Use the arrows to select the necessary options.
   For Plot 1, be sure that the Plot is On and a scatterplot is chosen (first Type). The independent variable (XList) is in L_1 and dependent variable (YList) is in L_2.



11. Choose an appropriate window by selecting [WINDOW] and specifying the appropriate domain and range.
    Use the arrow keys to move up and down.



12. To view the scatterplot, press [GRAPH].



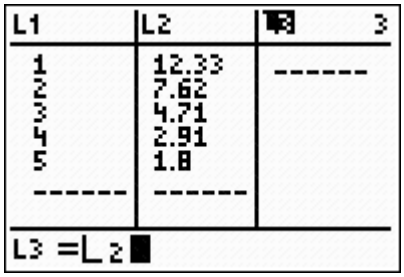
Part 1: Investigating Leg Length

Determining a Function Rule for Leg Length vs. Triangle Number Using a Graphing Calculator

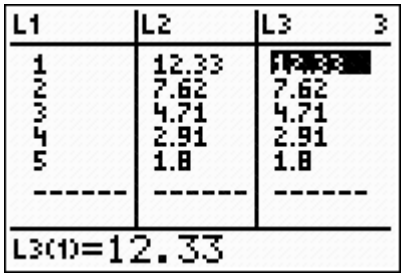
Note: Directions follow for use of a TI-83, TI-83+, or TI-84.

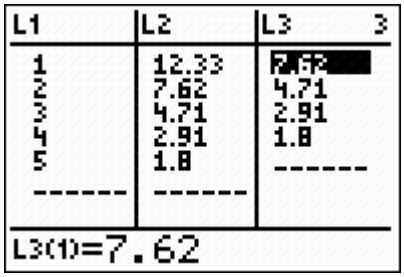
Using Successive Quotients:

1. In the List Editor (Press STAT then press ENTER), copy List 2 into List 3. To do so, use the arrow keys to move the cursor to the List 3 header, then press 2nd 2. Press ENTER.

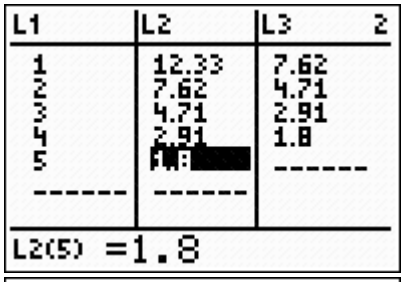


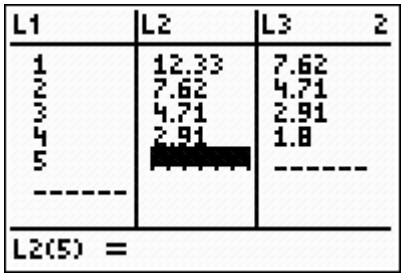
2. Delete the first element of List 3 by using the arrow keys to select it then press DEL.



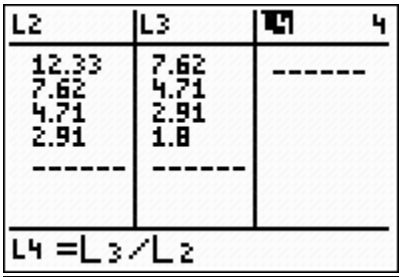


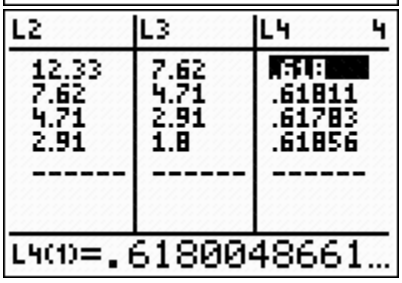
3. Delete the last element of List 2 by using the arrow keys to select it then press DEL.



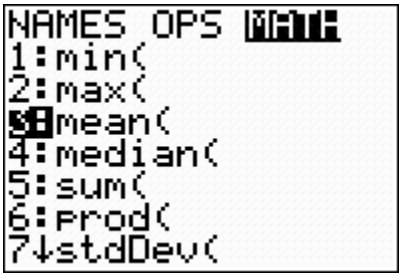


4. Use the arrow keys to select the List 4 header. We want List 4 to be the quotient of List 3 and List 2. Enter the formula $L_4 = L_3/L_2$ by pressing 2nd 3, ÷, then 2nd 2. List 4 now contains the successive quotients of the leg lengths, or y-values.

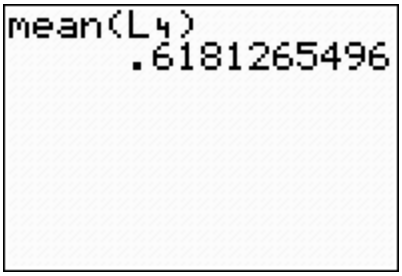




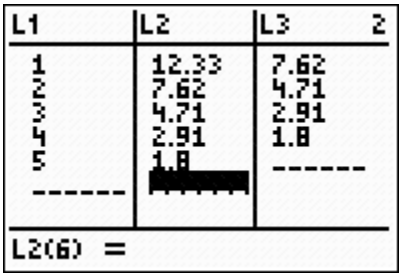
5. Return to the home screen by pressing 2nd MODE or [QUIT]. Calculate the mean value of the successive quotients (List 4) by using Math operations on the Lists. Retrieve the List menu by pressing 2nd STAT then choose the Math options using the arrow key ▶ twice. Use the down arrow key, ▼, to select option 3: mean.



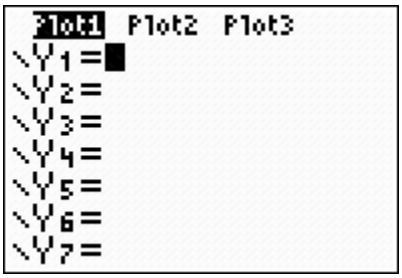
6. Enter the list name for which you want to find the mean value, in this case List 4, by pressing 2nd 4. Press ENTER.



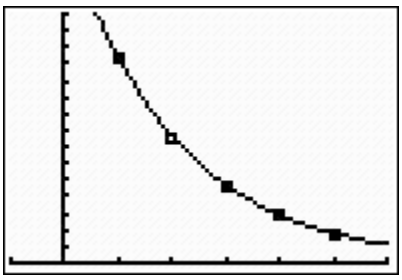
7. Restore the deleted value from List 2. Return to the List Editor (Press STAT then press ENTER), and use the arrow keys to move to the bottom of List 2. Re-enter the value that you deleted.



8. Use the mean value to determine the values of a and b in the general form $y = a(b)^x$. Graph the function rule that you think might "fit" the data well. To do so, press [Y=]. Clear out any equations by pressing [CLEAR].

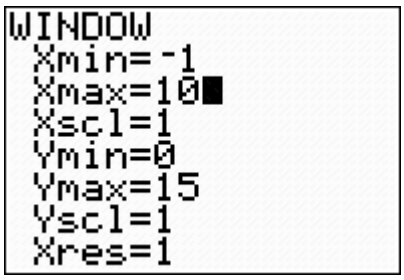


9. Enter the appropriate function rule into Y_1. Press [ENTER]. Press [GRAPH].

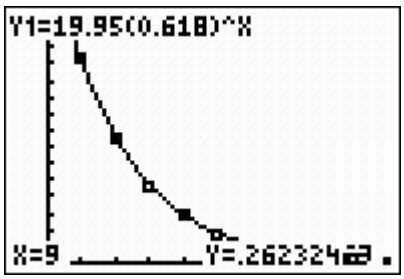


Using the Graph to Make Predictions

1. Press [WINDOW] to enlarge the window. Adjust the settings to make the window large enough to predict with.



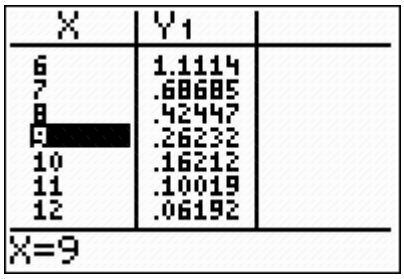
2. Press [GRAPH] then [TRACE]. Press [▲] to select the function then trace to the prediction using the right and left arrow keys, [◀][▶].



Using the Table to Make Predictions

1. Press 2nd WINDOW. Enter values for TblStart and ΔTbl, the value of the *x* increment.

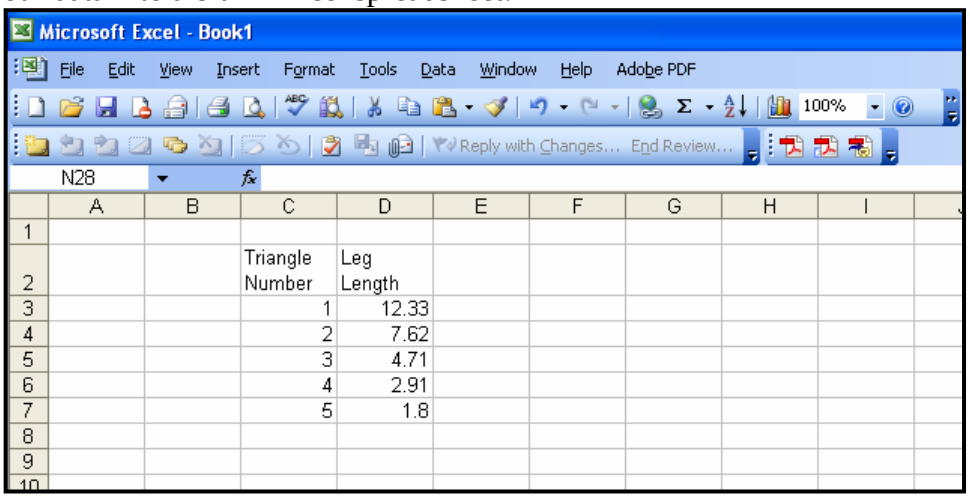
2. Press 2nd GRAPH. Use the up and down arrow keys, ▲ and ▼, to scroll to the desired value.



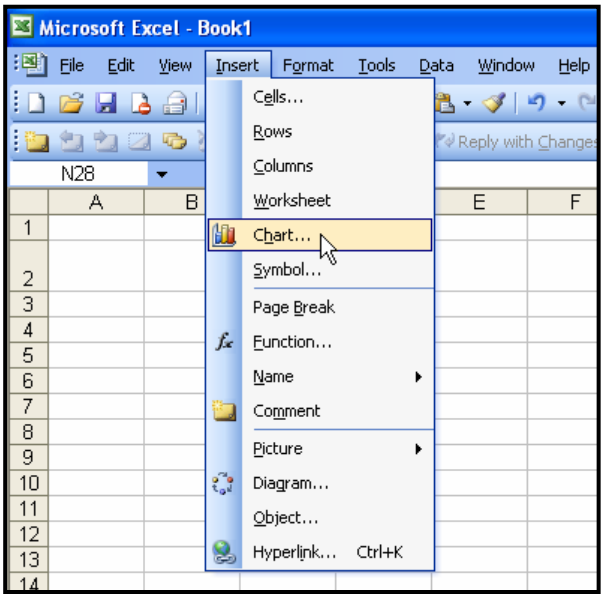
Part 1: Investigating Leg Length

Determining a Function Rule for Leg Length vs. Triangle Number Using a Microsoft Excel Spreadsheet

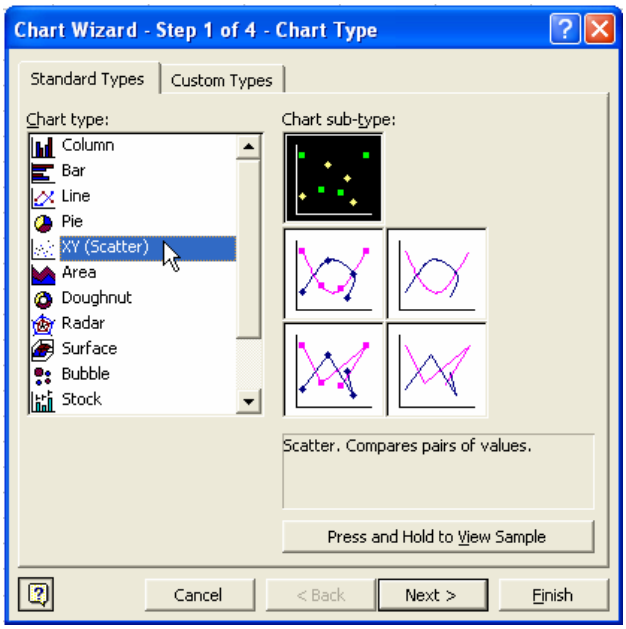
1. Enter your data into a blank Excel spreadsheet.



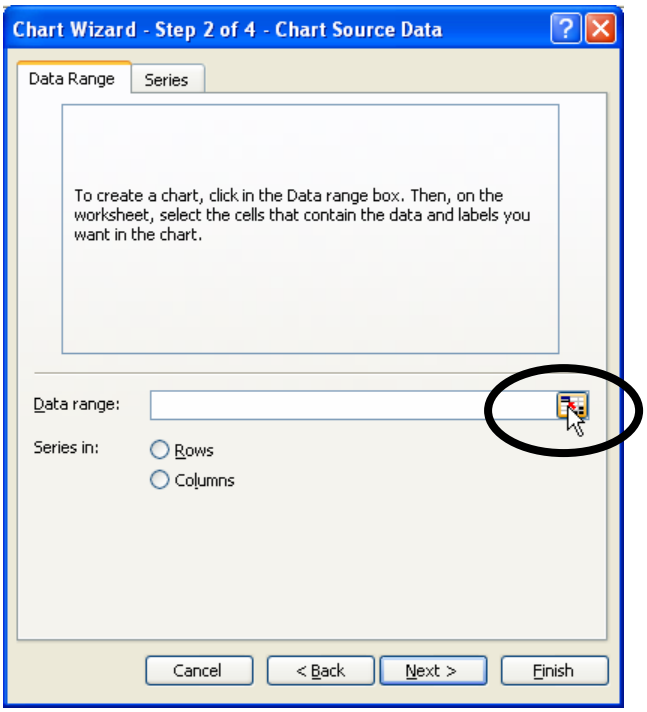
2. Choose **Chart** from the **Insert** menu.



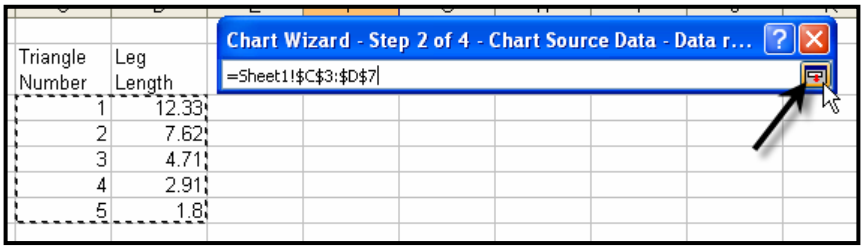
3. Select **XY (Scatter)** from the **Chart Type** selection box then click **Next**.



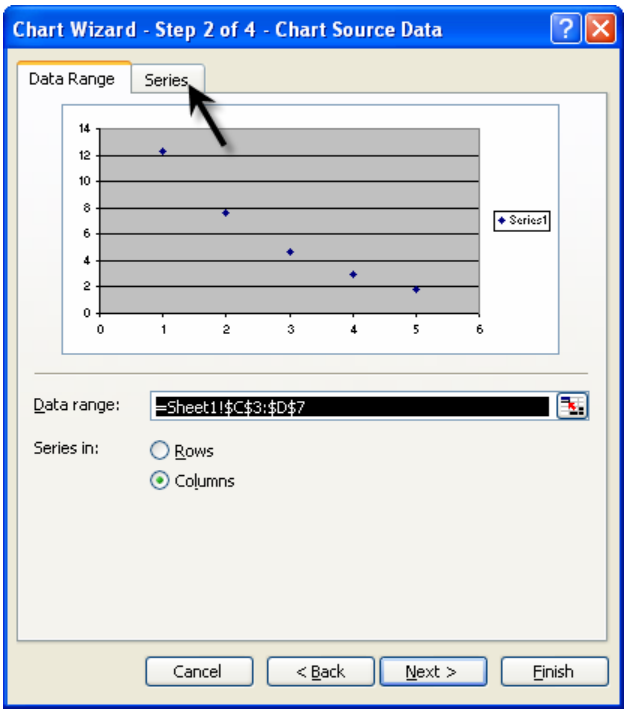
4. To select the Data Range, click the **Collapse Dialog** button next to the **Data Range** text box.



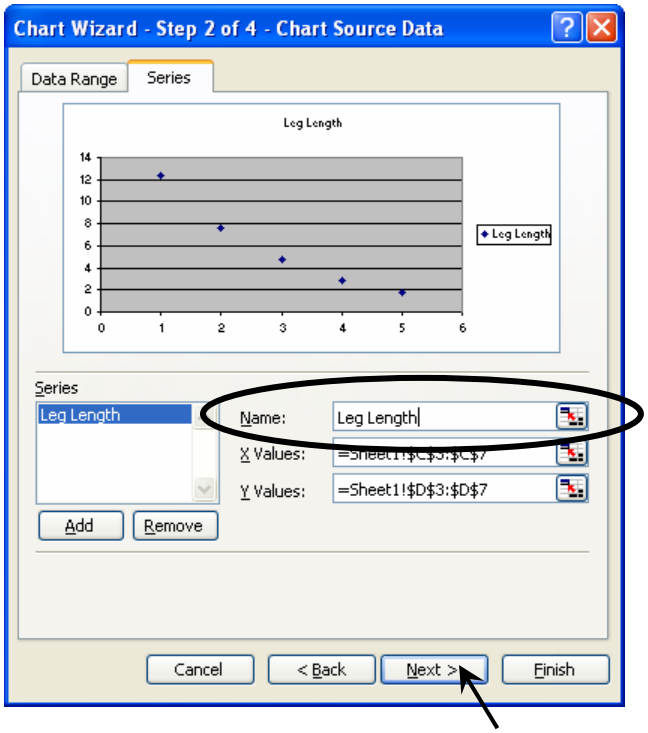
5. Select the cells containing your data then click the **Collapse Dialog** button next to the floating **Chart Source Data** box. You will return to the **Chart Wizard** dialog box.



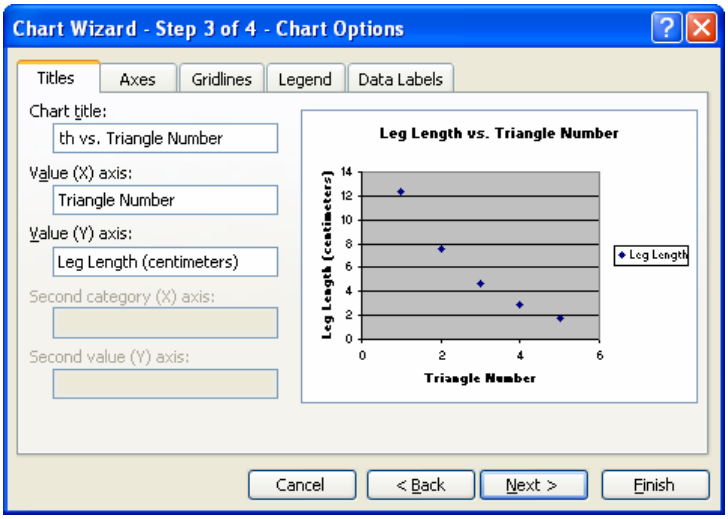
6. Click the **Series** tab in order to edit the source data features.

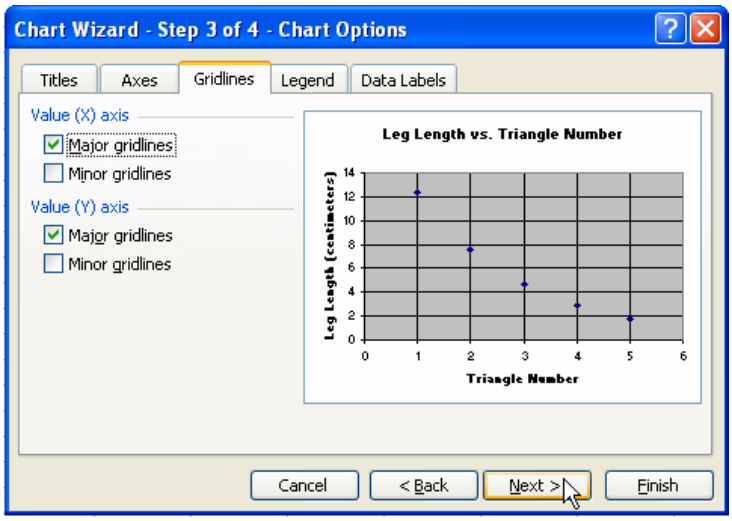


7. Give "Series 1" an appropriate name. Click inside the **Name** text box and type an appropriate name. In this example, we will use "Leg Length." Click **Next**.

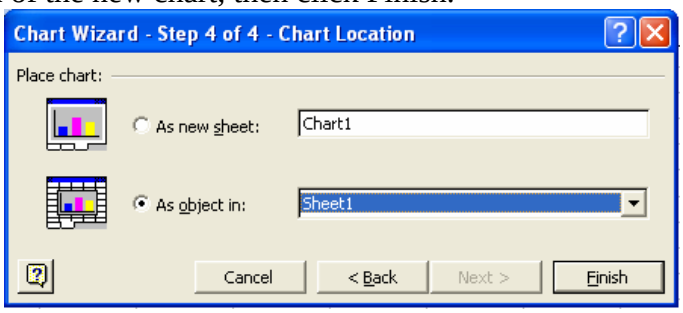


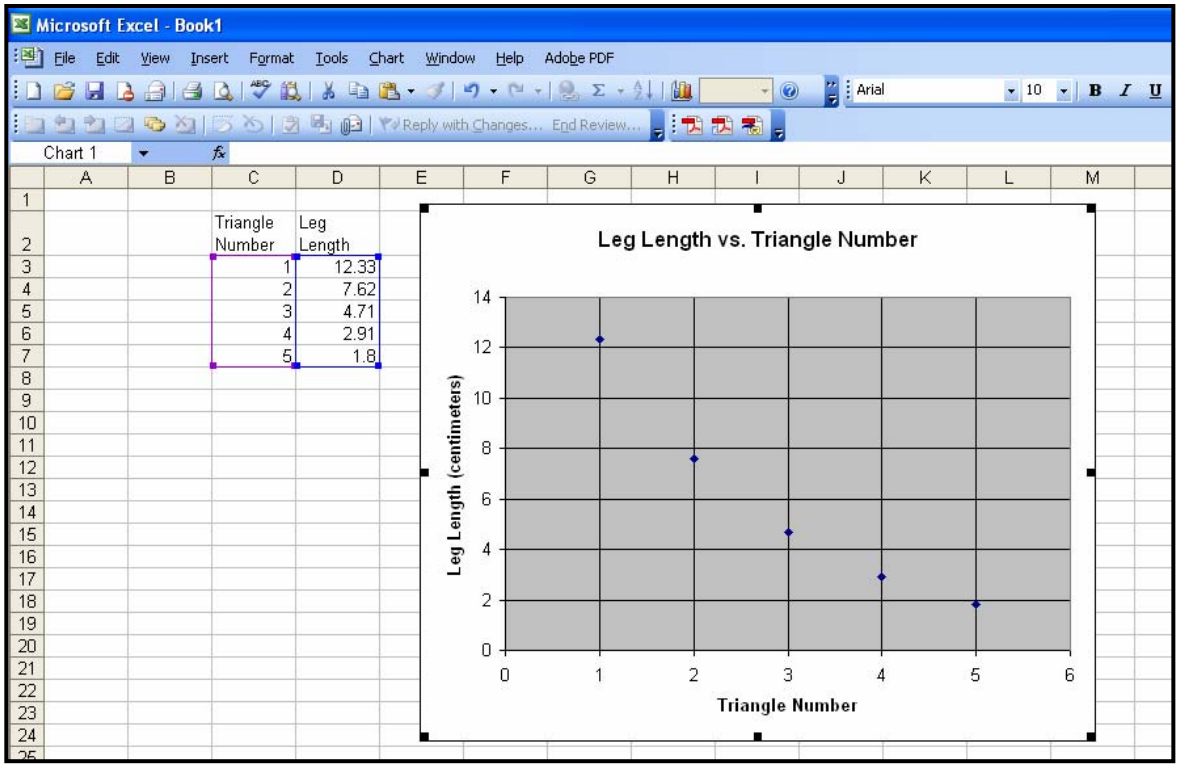
8. At this point you can customize the chart options, including the **Chart title**, **Value (*x*) axis**, and **Value (*y*) axis** labels. Enter the pertinent **Chart Options**, including appropriate labels for the x-axis and y-axis. You can also customize the axes, gridlines, legend, and data labels by clicking on the appropriate tab at the top of the dialog box. Click **Next** when you are ready to continue.





9. Select the location of the new chart, then click Finish.

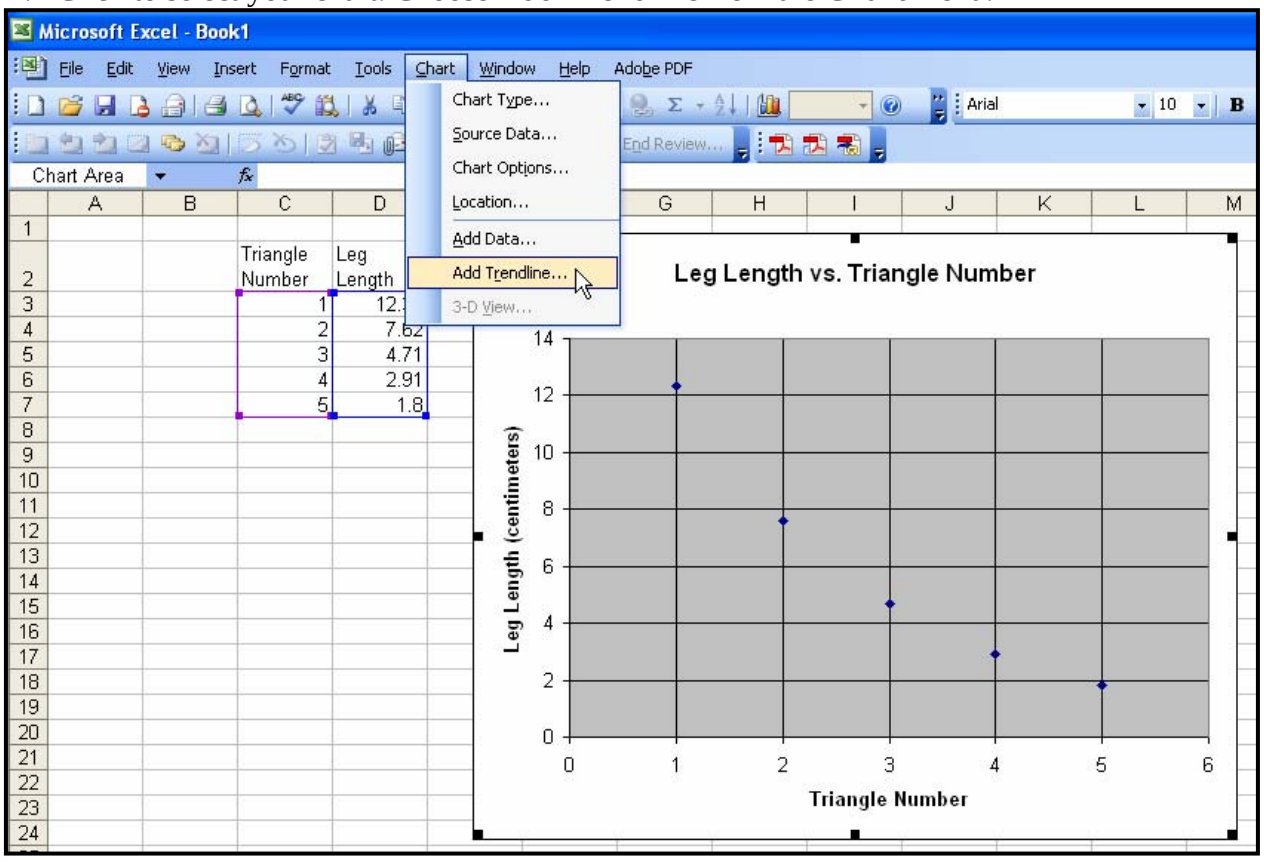




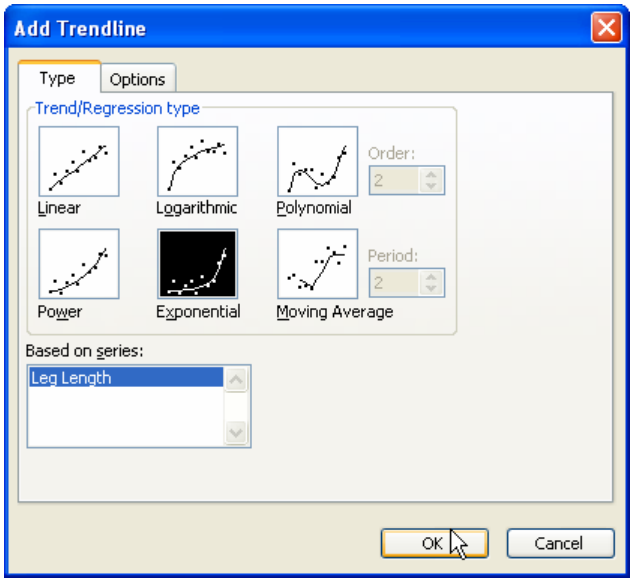
Part 1: Investigating Leg Length

Determining a Function Rule for Leg Length vs. Triangle Number Using a Microsoft Excel Spreadsheet

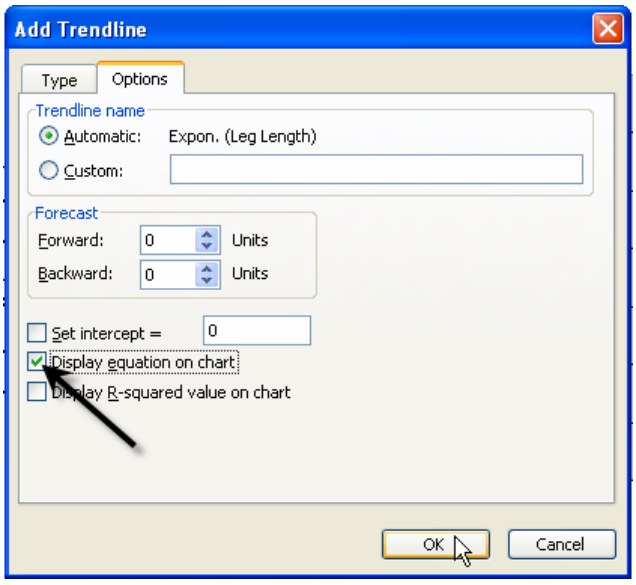
1. Click to select your chart. Choose **Add Trendline** from the **Chart** menu.



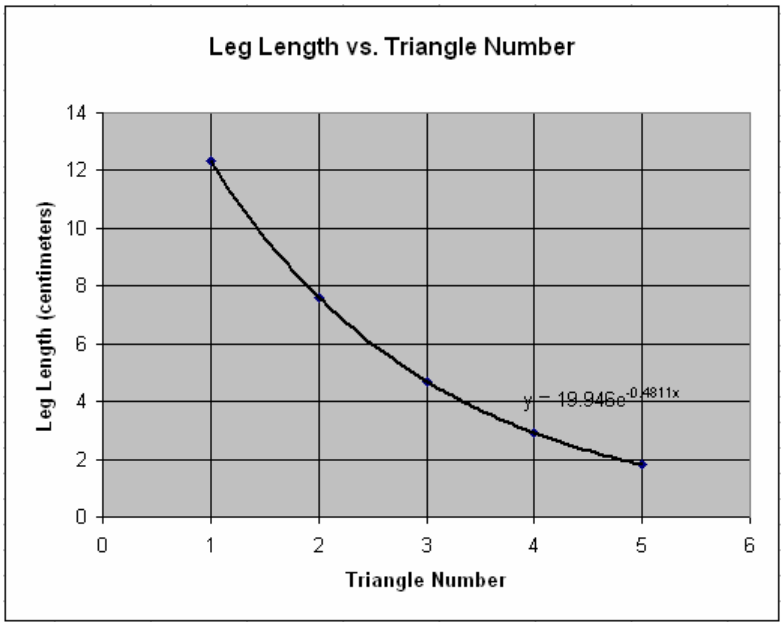
2. The **Add Trendline** dialog box will appear. Click on the **parent function** for the trendline you wish to graph. If you select **Polynomial** or **Moving Average**, be sure to select the order or period, respectively.

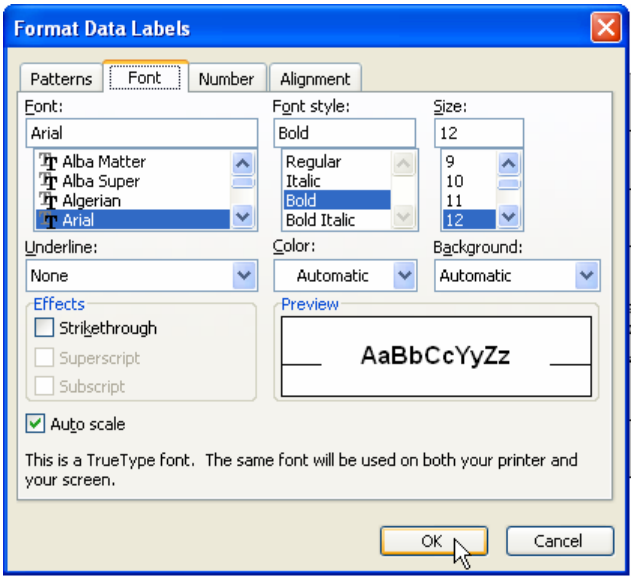


3. Click on the **Options** tab. Click on the **Display equation on chart** check box. Set any other features that you would like to customize related to your trend line. Click **OK**.



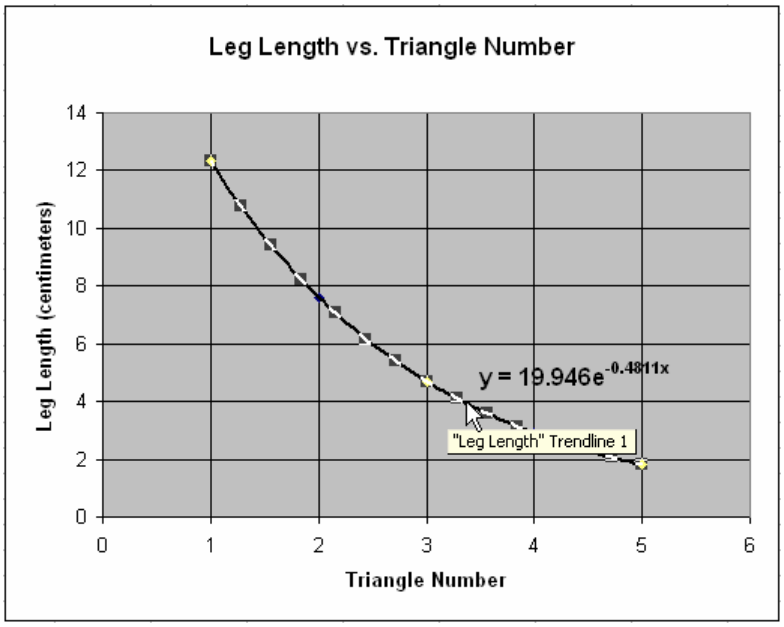
4. Customize the appearance of the equation by double-clicking on the equation. The **Format Data Labels** dialog box will appear. You can change the appearance of the equation, including font, number, and alignment. Click **OK** when you are finished.



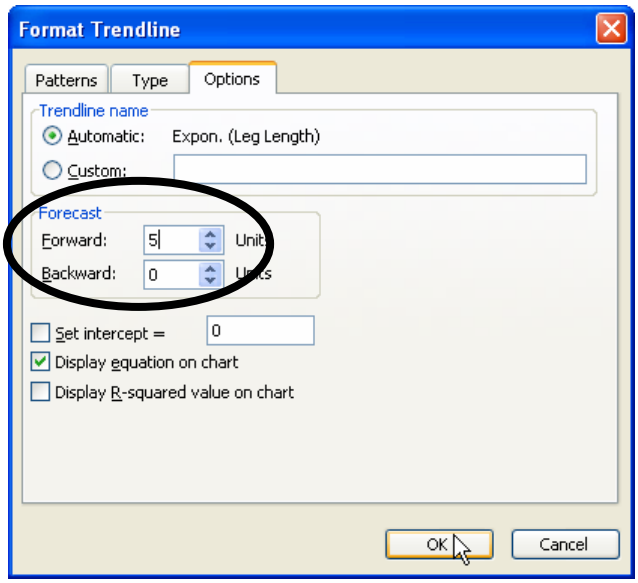


Using the Graph to Make Predictions

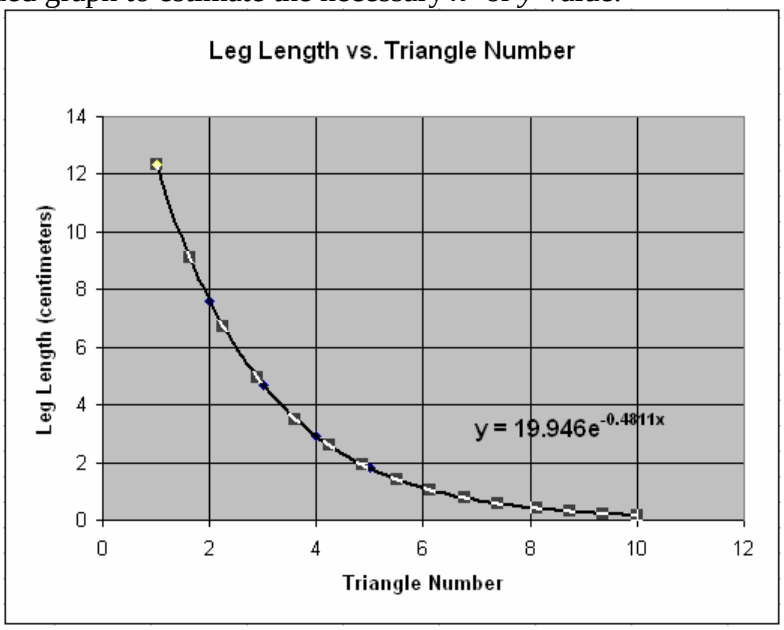
1. Double-click the trendline on your chart. The Format Trendline dialog box will appear.



2. Click the **Options** tab. In the **Forecast** text boxes, enter the number of units that you would like to extend the graph either **Forward** or **Backward** beyond your data set. Click **OK**.



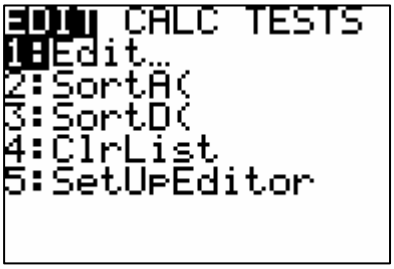
3. Use the extended graph to estimate the necessary *x*- or *y*-value.



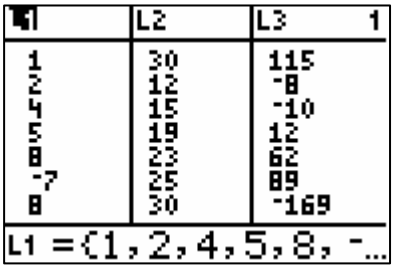
Part 2: Investigating Dilations

Generating a Scatterplot of Leg Length vs. Dilation Number Using a Graphing Calculator

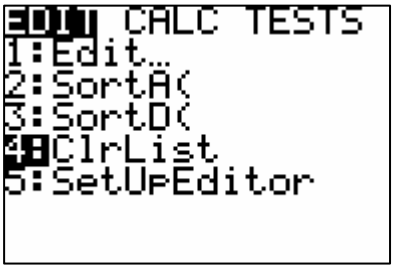
1. Press [STAT]. Then press [ENTER].



2. You will see a table containing lists. Your calculator may contain data in its lists from a previous investigation. If the lists do not contain previous data, you may skip to step 6.

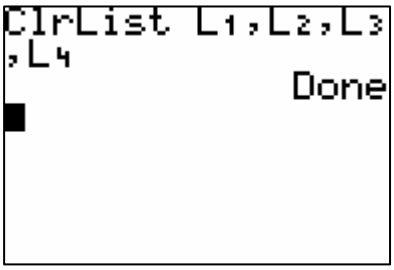


3. To clear this previous data, press [STAT].

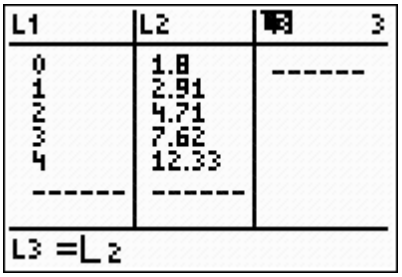


4. Highlight **ClrList**. Enter the lists that you wish to clear. Press [ENTER].

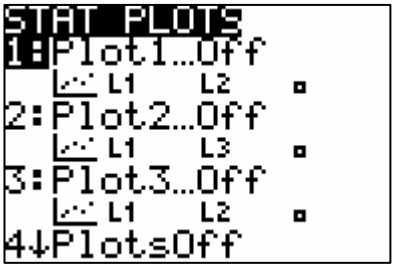
5. Press [ENTER] again.



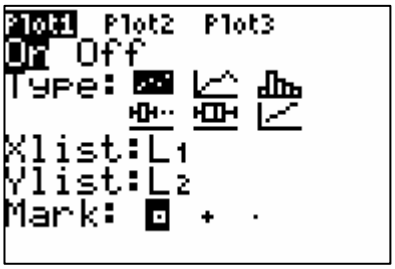
6. Enter the data into the lists.
   Be sure to press [ENTER] after each value.



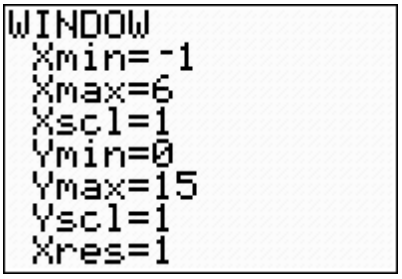
7. Press [2nd] [STAT PLOT].



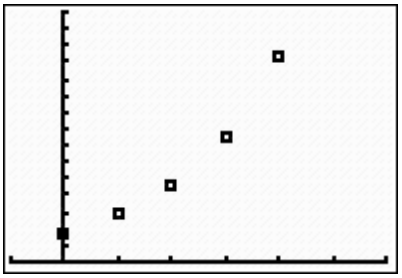
8. Use the arrows to select the necessary options.
   For Plot 1, be sure that the Plot is On and a scatterplot is chosen (first Type). The independent variable (XList) is in L_1 and dependent variable (YList) is in L_2.



11. Choose an appropriate window by selecting [WINDOW] and specifying the appropriate domain and range.
    Use the arrow keys to move up and down.



12. To view the scatterplot, press [GRAPH].



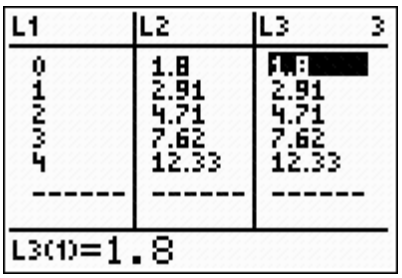
Part 2: Investigating Dilations

Determining a Function Rule for Leg Length vs. Dilation Number Using a Graphing Calculator

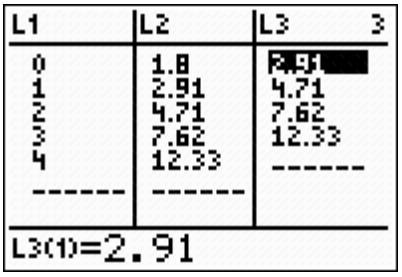
Note: Directions follow for use of a TI-83, TI-83+, or TI-84.

Using Successive Quotients:

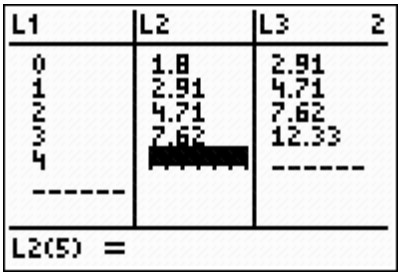
1. In the List Editor (Press [STAT] then press [ENTER]), copy List 2 into List 3. To do so, use the arrow keys to move the cursor to the List 3 header, then press [2nd] [2]. Press [ENTER].



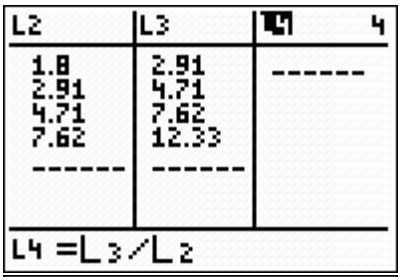
2. Delete the first element of List 3 by using the arrow keys to select it then press [DEL].

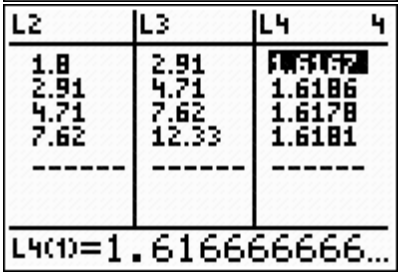


3. Delete the last element of List 2 by using the arrow keys to select it then press [DEL].

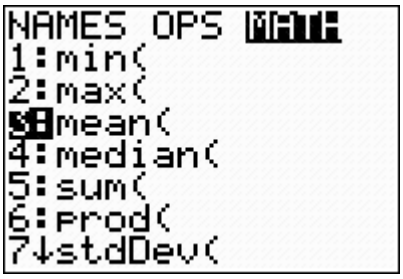


4. Use the arrow keys to select the List 4 header. We want List 4 to be the quotient of List 3 and List 2. Enter the formula $L_4 = L_3/L_2$ by pressing [2nd] [3], [÷], then [2nd] [2]. List 4 now contains the successive quotients of the leg lengths, or y-values.

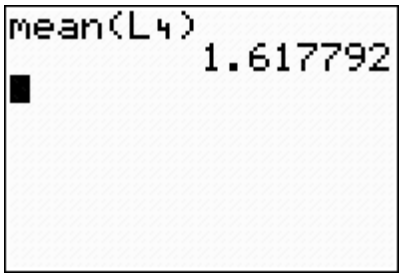




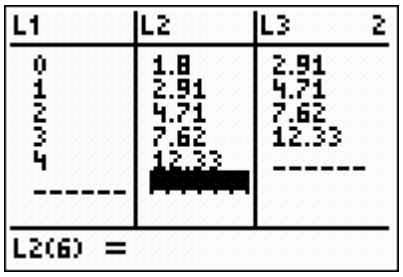
5. Return to the home screen by pressing 2nd MODE or [QUIT]. Calculate the mean value of the successive quotients (List 4) by using Math operations on the Lists. Retrieve the List menu by pressing 2nd STAT, then choose the Math options using the arrow key ▶ twice. Use the down arrow key, ▼, to select option 3: mean.



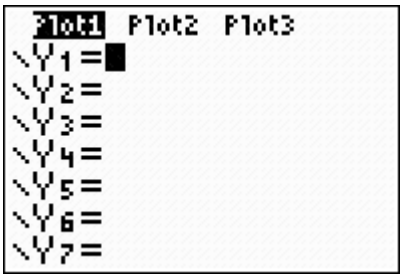
6. Enter the list name of which you want to find the mean value, in this case List 4 by pressing 2nd 4. Press ENTER.



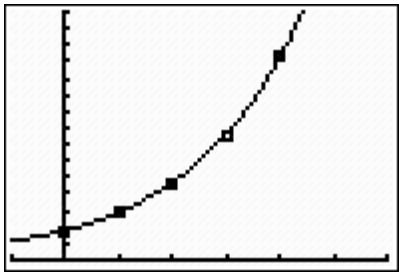
7. Restore the deleted value from List 2. Return to the List Editor (Press STAT then press ENTER) and use the arrow keys to move to the bottom of List 2. Re-enter the value that you deleted.



8. Use the mean value to determine the values of a and b in the general form $y = a(b)^x$. Graph the function rule that you think might "fit" the data well. To do so, press Y=. Clear out any equations by pressing CLEAR.

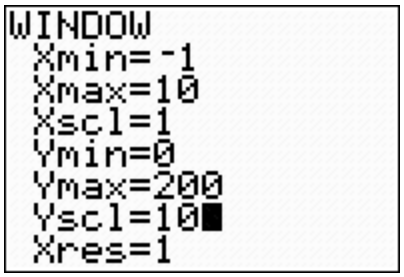


9. Enter the appropriate function rule into Y_1. Press ENTER. Press GRAPH.

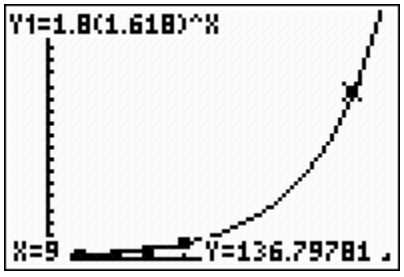


Using the Graph to Make Predictions

1. Press [WINDOW] to adjust the window. Adjust the settings to enlarge the window enough to make predictions.



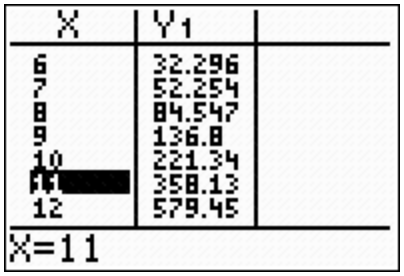
2. Press [GRAPH] then [TRACE]. Press [▲] to select the function then trace to the prediction using the right and left arrow keys, [◀][▶].



Using the Table to Make Predictions

1. Press [2nd] [WINDOW]. Enter values for TblStart and ΔTbl, the value of the *x* increment.

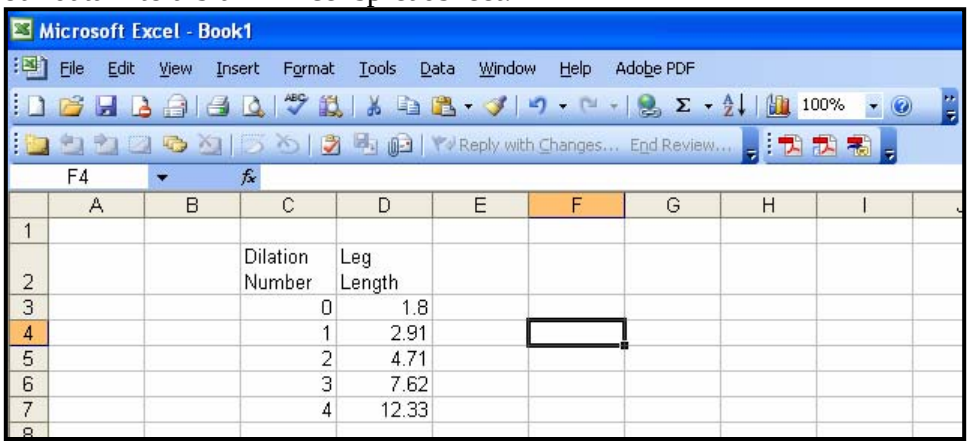
2. Press [2nd] [GRAPH]. Use the up and down arrow keys, [▲] and [▼], to scroll to the desired value.



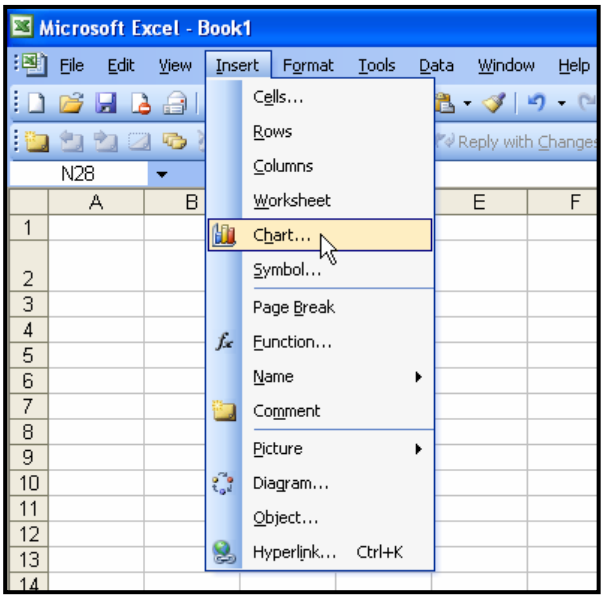
Part 2: Investigating Dilations

Determining a Function Rule for Leg Length vs. Triangle Number Using a Microsoft Excel Spreadsheet

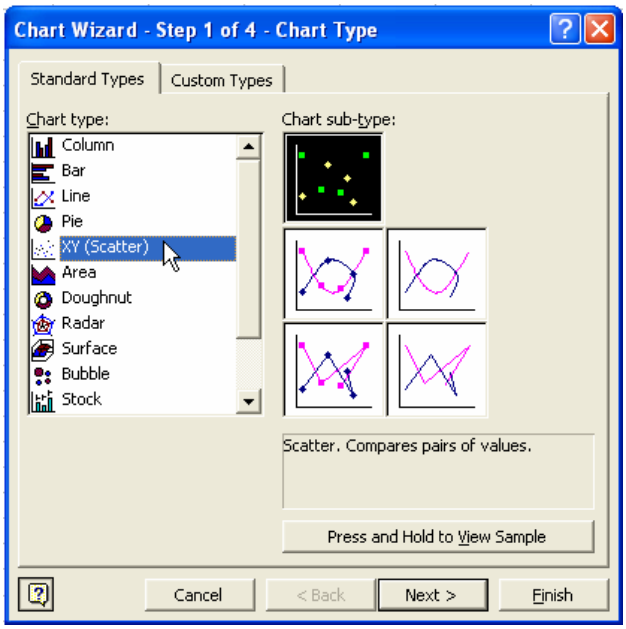
1. Enter your data into a blank Excel spreadsheet.



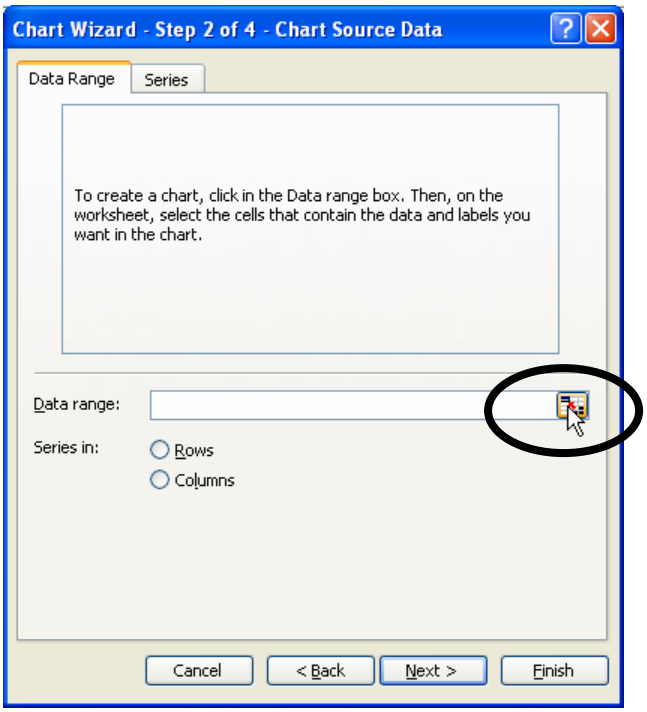
2. Choose **Chart** from the **Insert** menu.



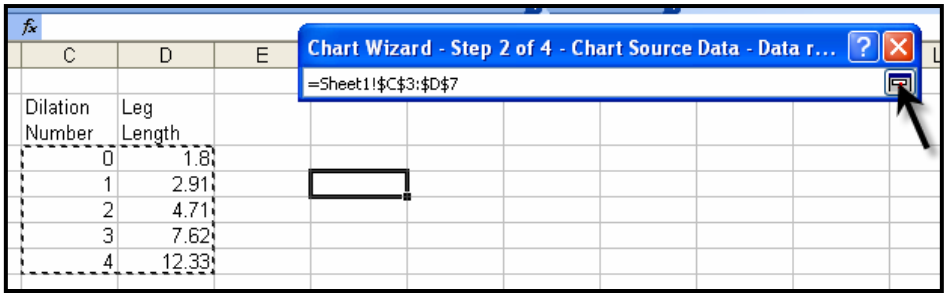
3. Select **XY (Scatter)** from the **Chart Type** selection box then click **Next**.



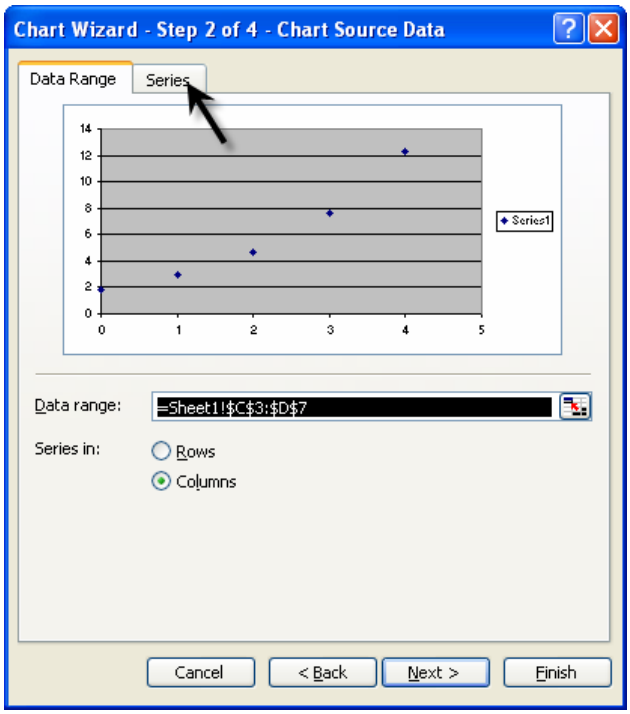
4. To select the Data Range, click the **Collapse Dialog** button next to the **Data Range** text box.



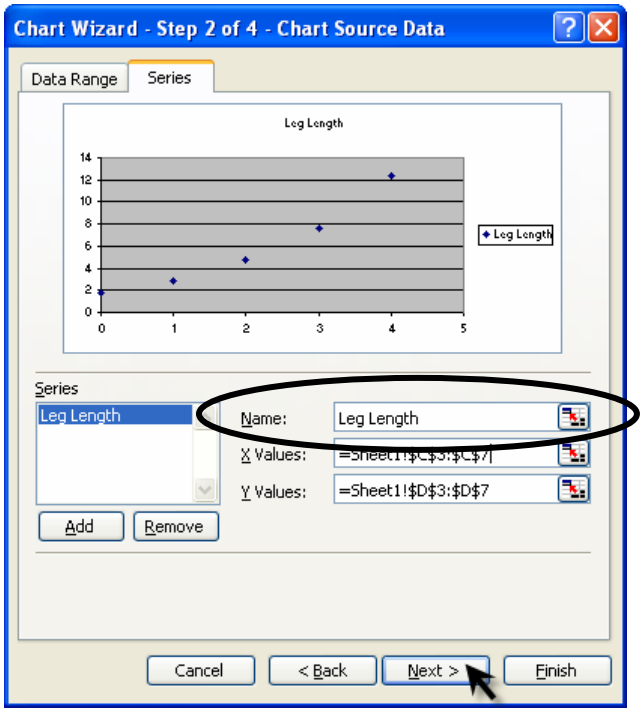
5. Select the cells containing your data then click the **Collapse Dialog** button next to the floating **Chart Source Data** box. You will return to the **Chart Wizard** dialog box.



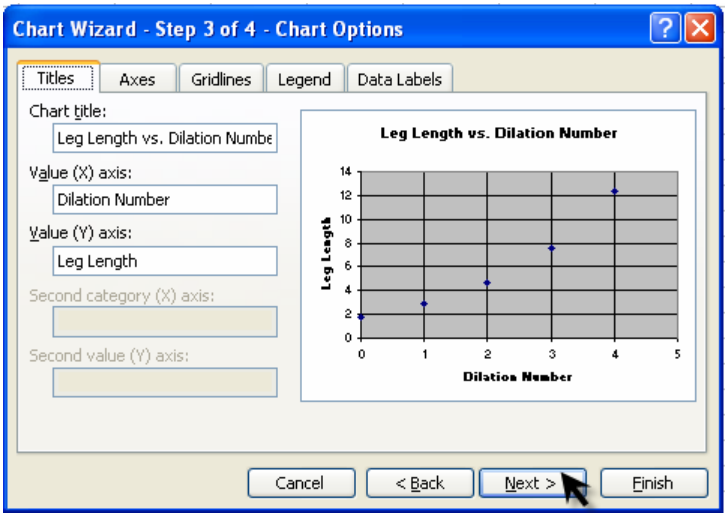
6. Click the **Series** tab to edit the source data features.



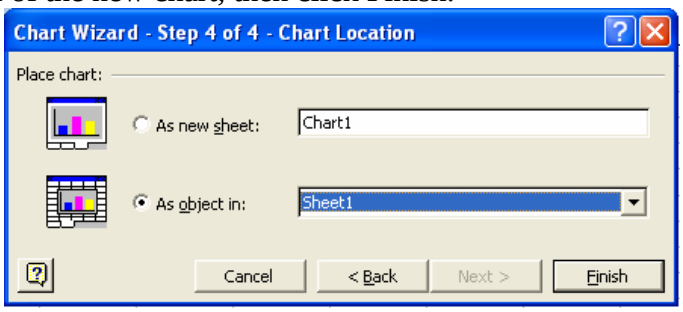
7. Give "Series 1" an appropriate name. Click inside the **Name** text box and type an appropriate name. In this example, we will use "Leg Length." Click **Next**.

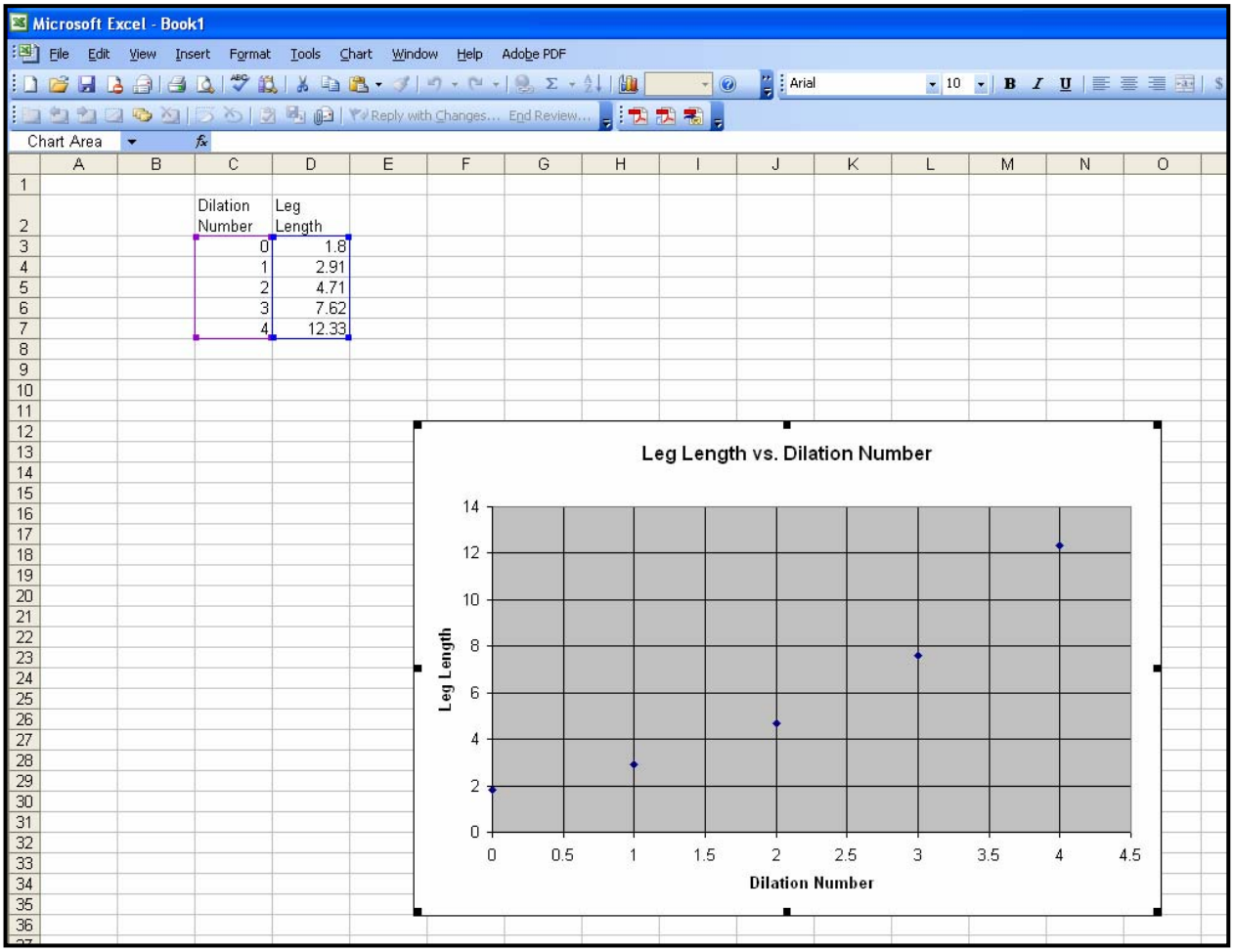


8. At this point you can customize the chart options, including the **Chart title**, **Value (*x*) axis**, and **Value (*y*) axis** labels. Enter the pertinent **Chart Options**, including appropriate labels for the x-axis and y-axis. You can also customize the axes, gridlines, legend, and data labels by clicking on the appropriate tab at the top of the dialog box. Click **Next** when you are ready to continue.

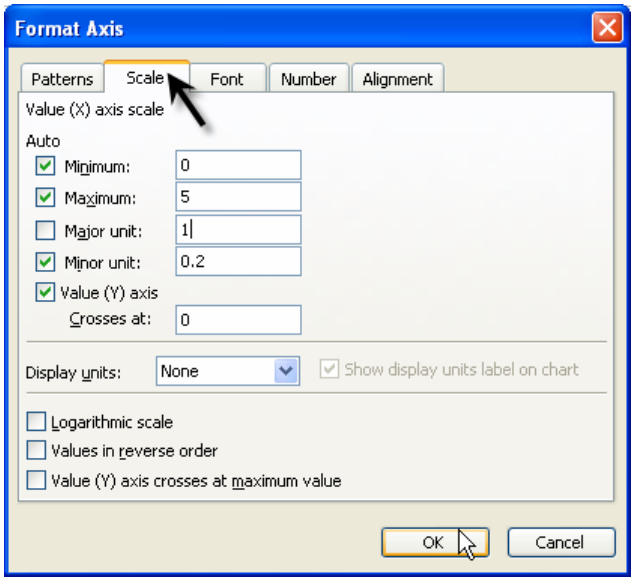


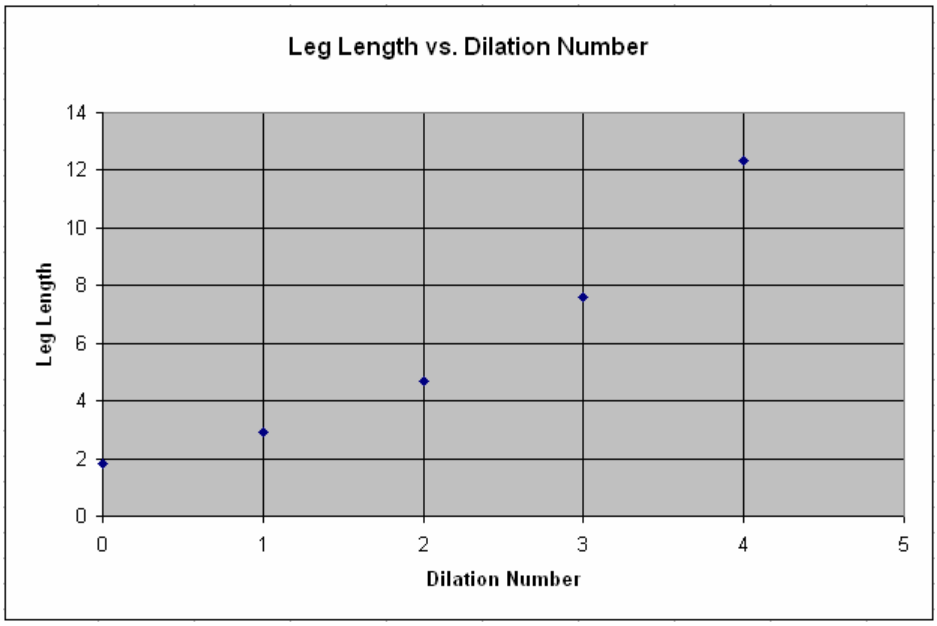
9. Select the location of the new chart, then click Finish.





10. You can customize the features of your chart by double-clicking the part that you wish to change. For example, to change the scale of the *x*-axis, double-click the *x*-axis. The **Format Axis** dialog box will appear. Click on the **Scale** tab, then change the major unit. Click **OK**.

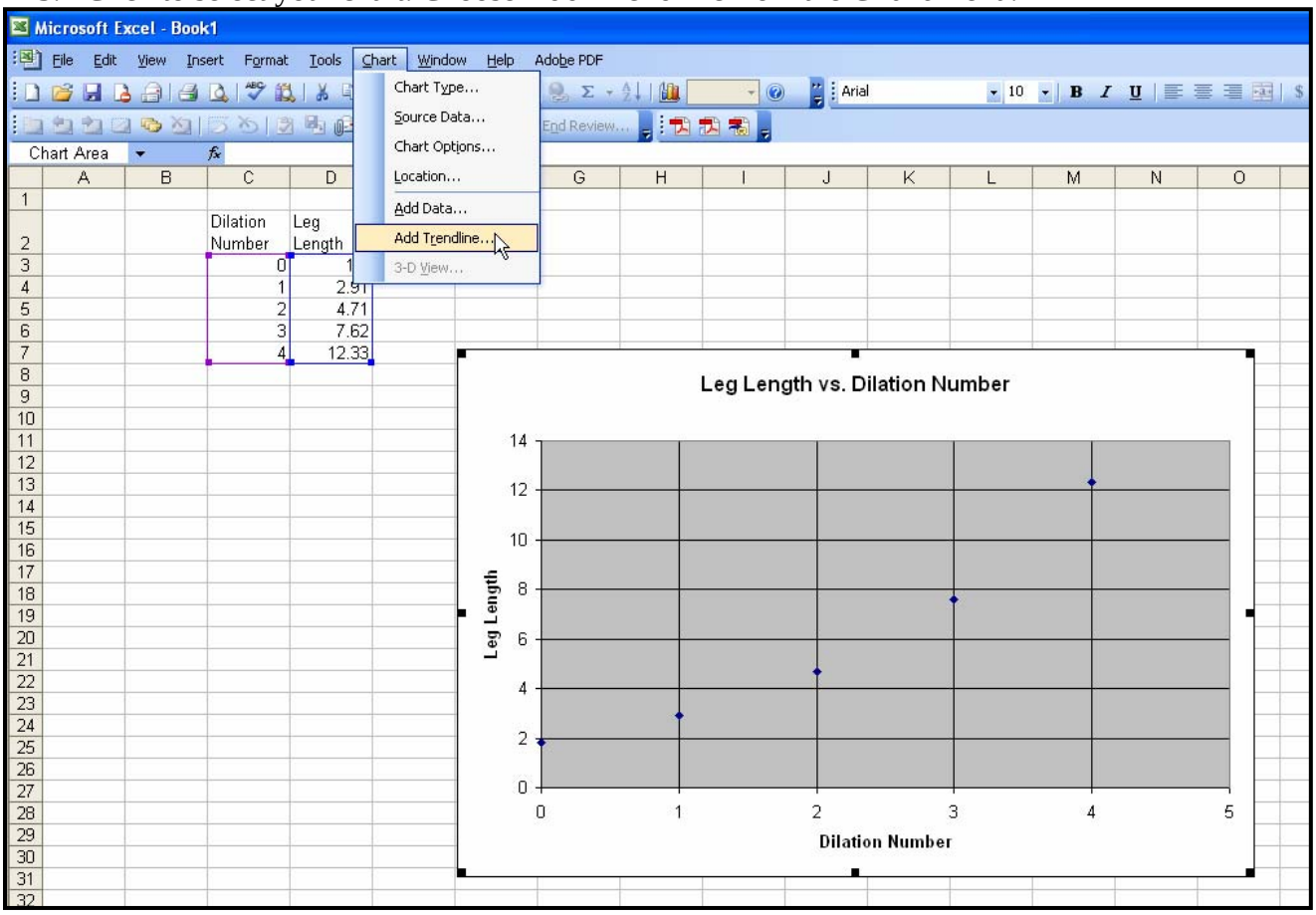




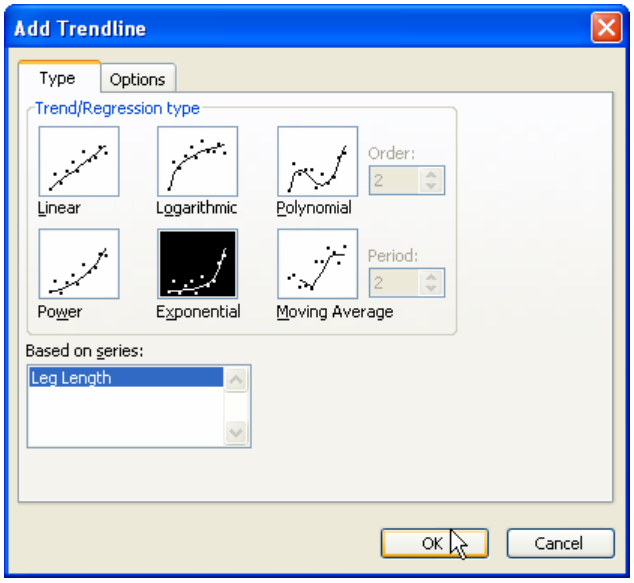
Part 2: Investigating Dilations

Determining a Function Rule for Leg Length vs. Triangle Number Using a Microsoft Excel Spreadsheet

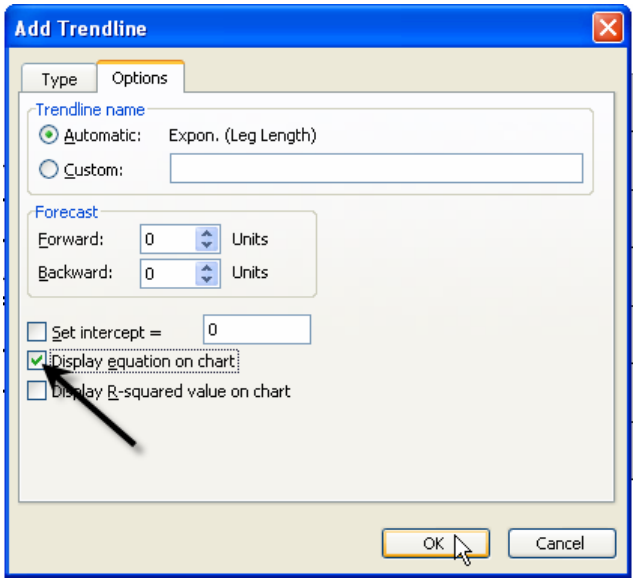
5. Click to select your chart. Choose **Add Trendline** from the **Chart** menu.



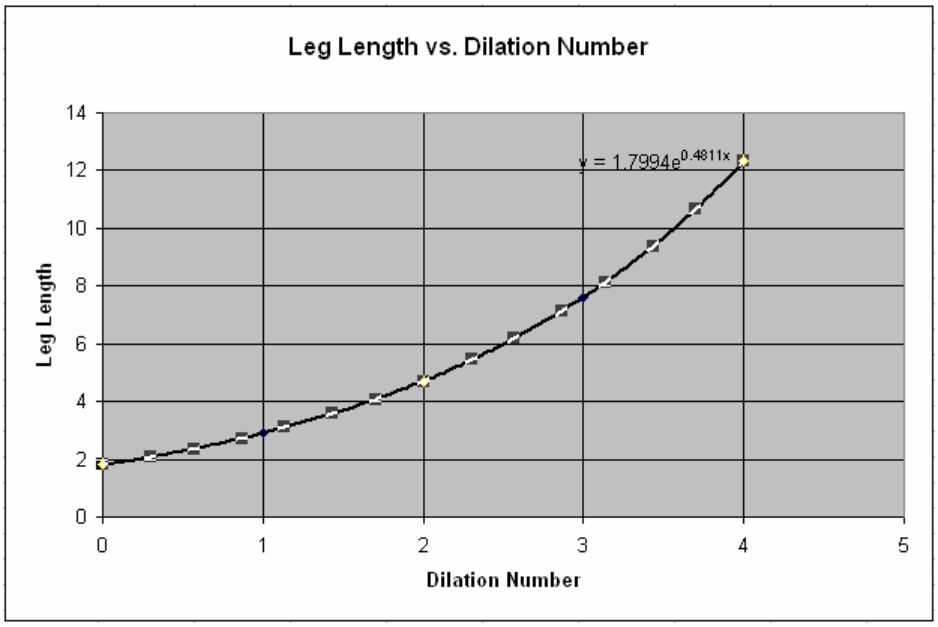
6. The **Add Trendline** dialog box will appear. Click on the **parent function** for the trendline you wish to graph. If you select **Polynomial** or **Moving Average**, be sure to select the order or period, respectively.

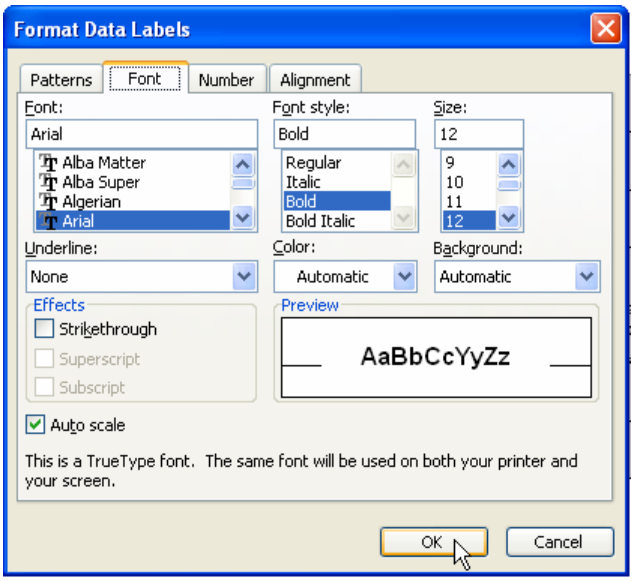


7. Click on the **Options** tab. Click on the **Display equation on chart** check box. Set any other features that you would like to customize related to your trend line. Click **OK**.



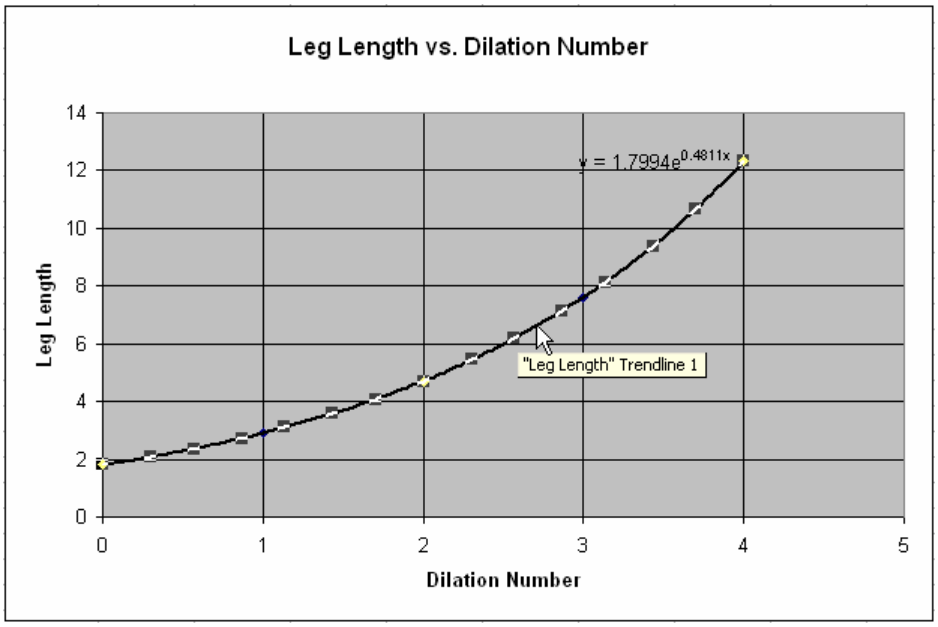
8. Customize the appearance of the equation by double-clicking on the equation. The **Format Data Labels** dialog box will appear. You can change the appearance of the equation, including font, number, and alignment. Click **OK** when you are finished.



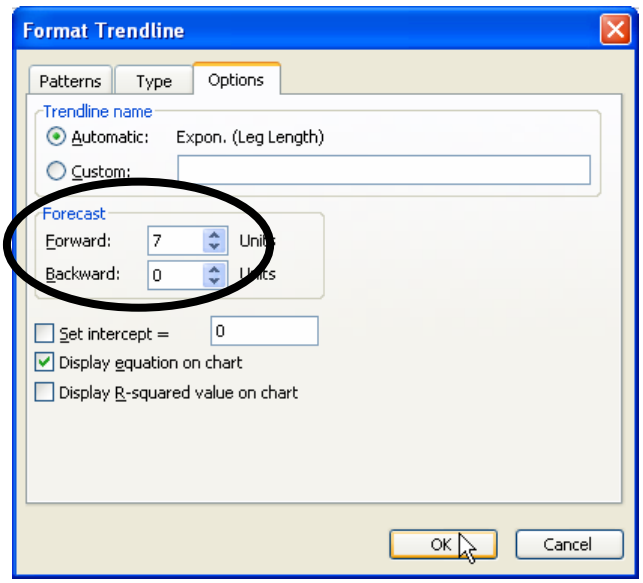


Using the Graph to Make Predictions

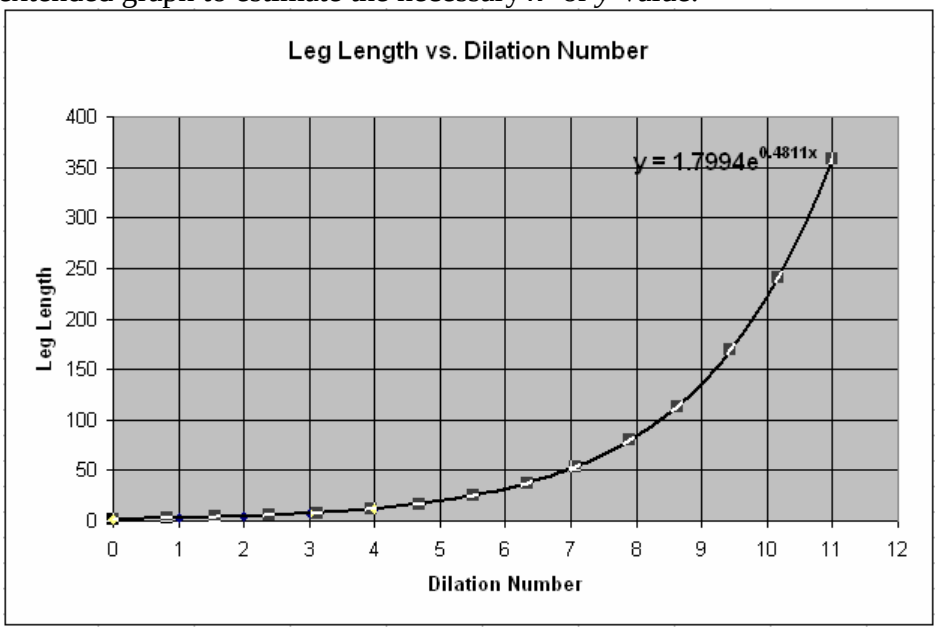
4. Double-click the trendline on your chart. The Format Trendline dialog box will appear.



5. Click the **Options** tab. In the **Forecast** text boxes, enter the number of units that you would like to extend the graph either **Forward** or **Backward** beyond your data set. Click **OK**.



6. Use the extended graph to estimate the necessary *x*- or *y*-value.

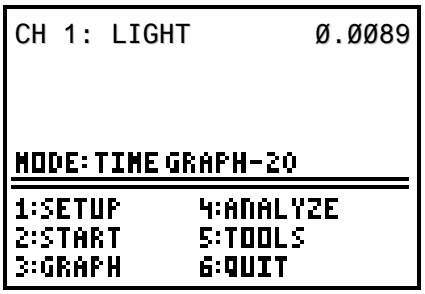


Using the CBL2 and Light Probe to Collect Data

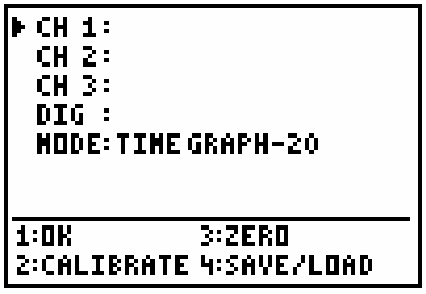
1. Plug the light sensor into a Channel port of your CBL2. Run a data collection program, such as the DataMate App. Press [APPS], then use [▼] to scroll down to DataMate.

   The DataMate program will automatically recognize the light sensor. The number in the top right corner is the reading of light intensity in milliwatts per square centimeter.

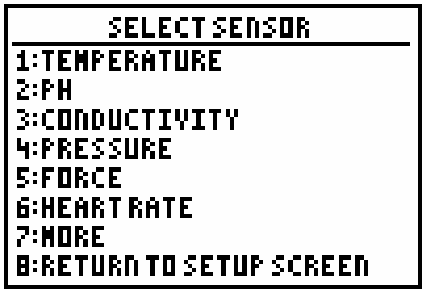
2. If DataMate does not automatically recognize the light sensor, then select option 1: SETUP by pressing [1].

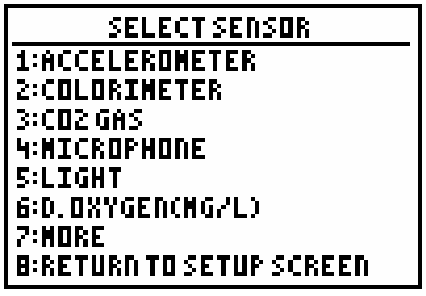


3. Select the Channel port into which you plugged the light sensor. Press [▲] or [▼] so that the arrow is next to the appropriate Channel. Press [ENTER].

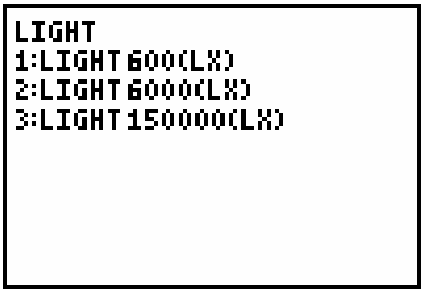


4. Look for the **LIGHT** sensor. If you do not see it on the current screen, select **7: MORE** by pressing [7]. When you see **LIGHT** listed, select **5: LIGHT** by pressing [5].

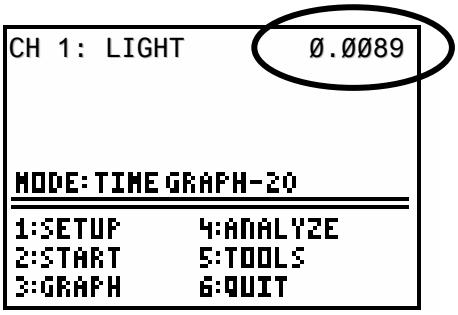




5. Select the light probe that you are using by pressing 1, 2, or 3. You will be returned to the main screen.



6. Read the light intensity (in milliwatts per square centimeter) by observing the number in the top-right corner of the screen.

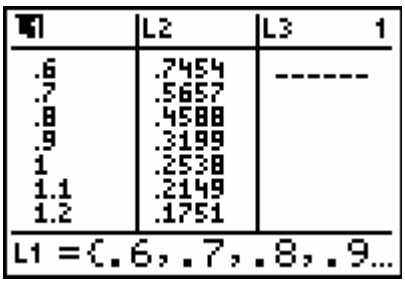


7. To collect the next data point, move the light probe away from the light source, then read the intensity. Continue until you have collected the necessary data.

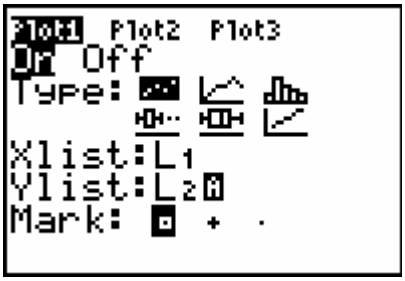
8. Press 6 to return to the home screen.

Generating a Scatterplot Using a Graphing Calculator

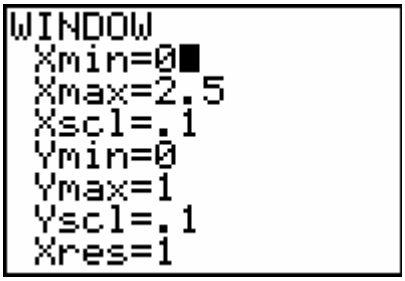
1. Enter data into the [STAT] lists.



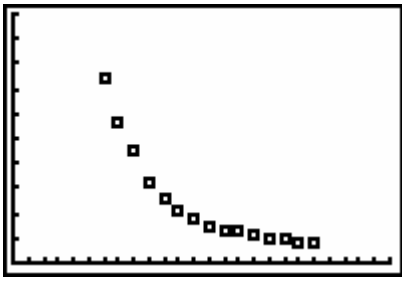
2. Turn on the [STAT PLOT] by pressing [2nd][Y=]. Select the necessary options. In this case, choose a scatterplot with independent variable in [L1] and dependent variable in [L2].



3. Choose an appropriate window by pressing [WINDOW] and specifying the appropriate domain and range. Use [▲][▼] to move up and down the list. Type the desired value then press [ENTER].

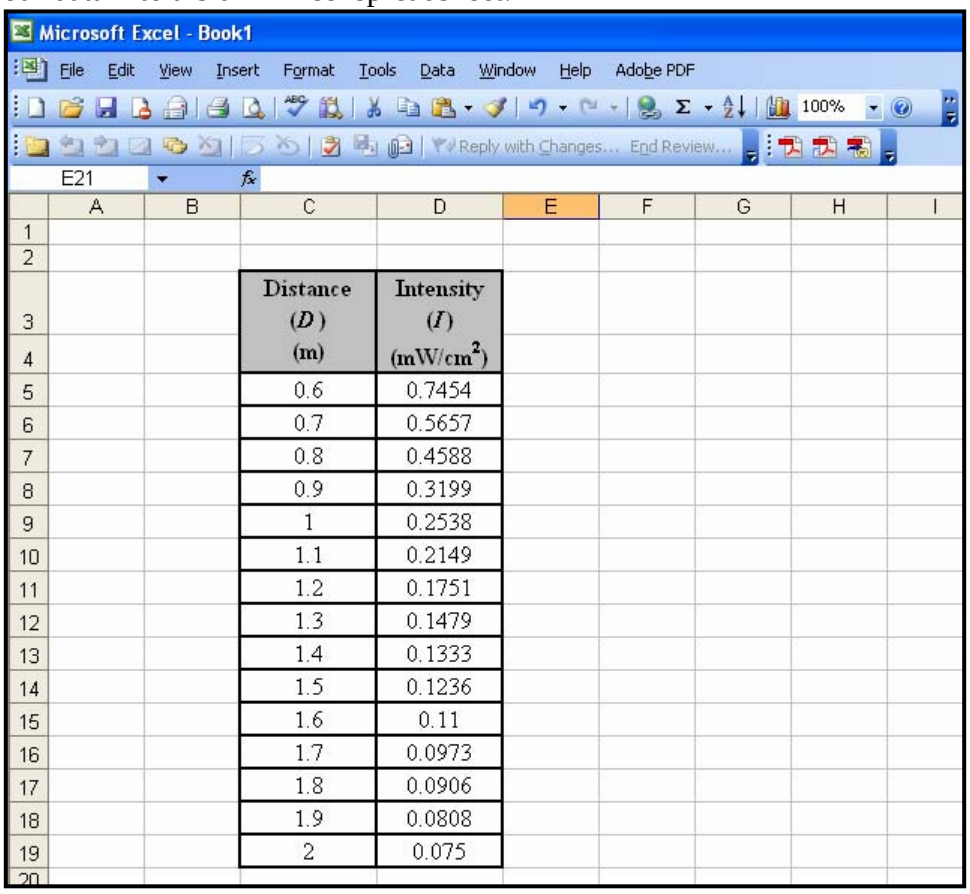


4. To view the graph, select [GRAPH].



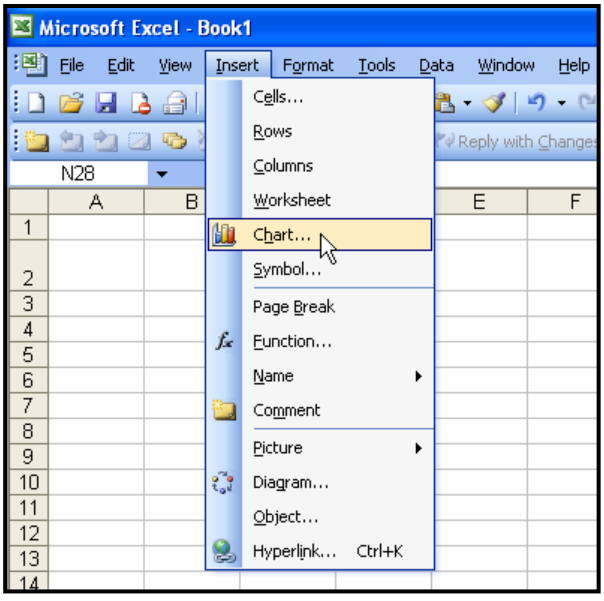
Generating a Scatterplot Using Microsoft Excel

1. Enter your data into a blank Excel spreadsheet.

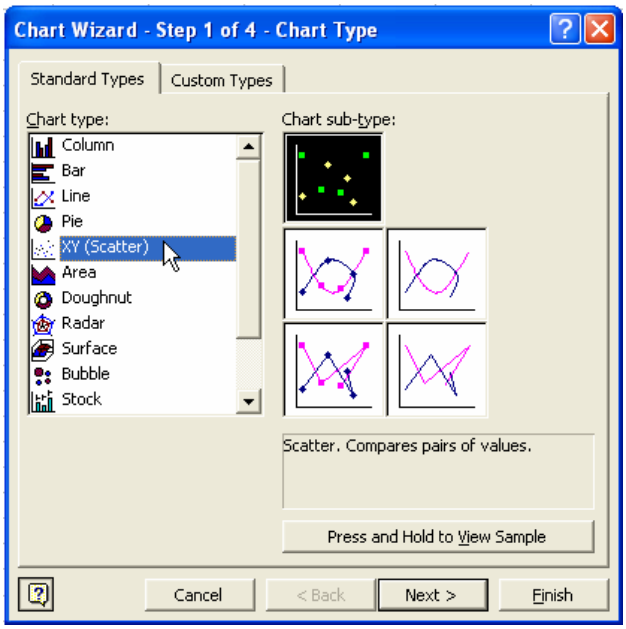


Distance (D) (m)	Intensity (I) (mW/cm^2)
0.6	0.7454
0.7	0.5657
0.8	0.4588
0.9	0.3199
1	0.2538
1.1	0.2149
1.2	0.1751
1.3	0.1479
1.4	0.1333
1.5	0.1236
1.6	0.11
1.7	0.0973
1.8	0.0906
1.9	0.0808
2	0.075

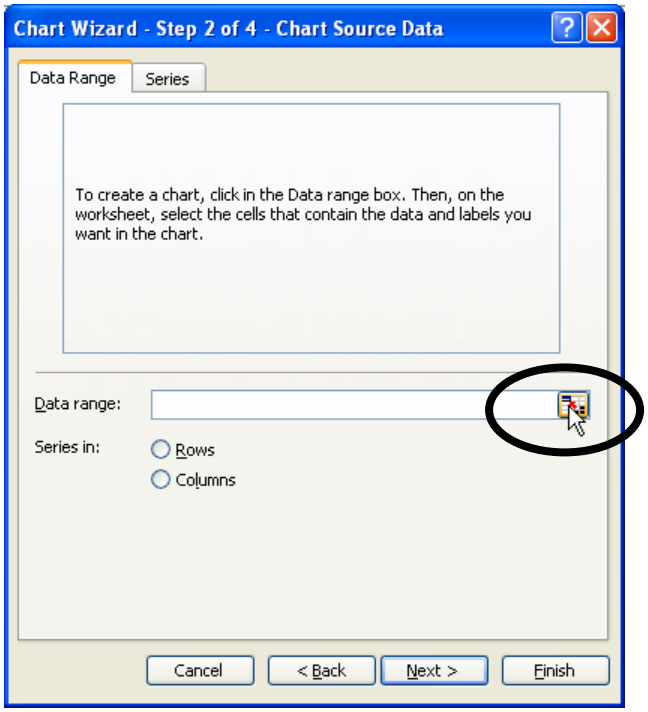
2. Choose **Chart** from the **Insert** menu.



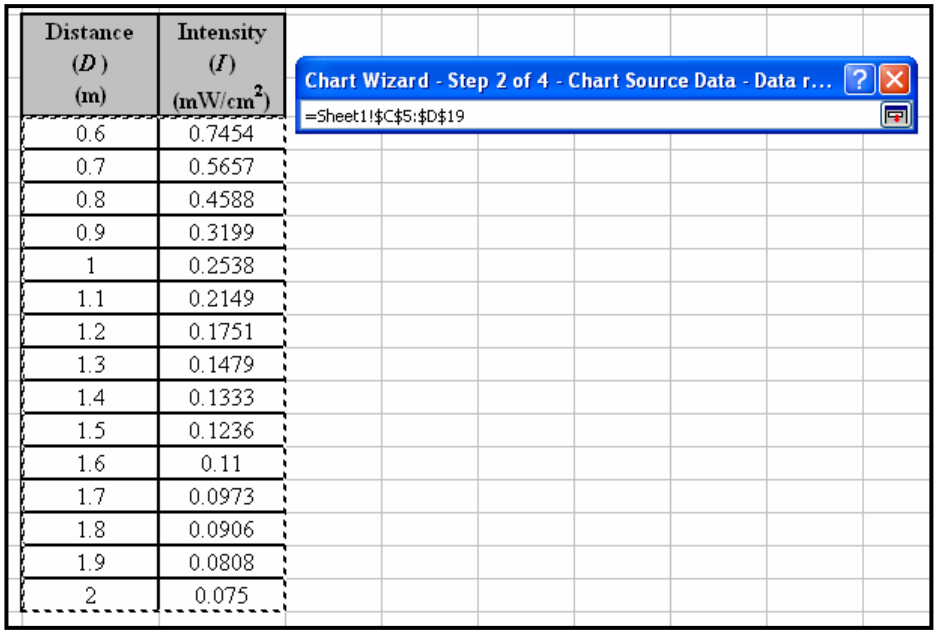
3. Select **XY (Scatter)** from the **Chart Type** selection box then click **Next**.



4. To select the Data Range, click the **Collapse Dialog** button next to the **Data Range** text box.

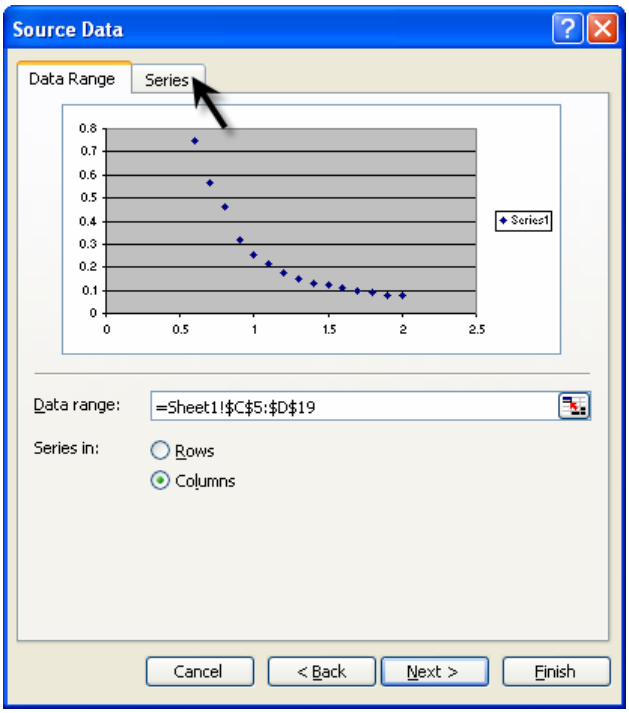


5. Select the cells containing your data then click the **Collapse Dialog** button next to the floating **Chart Source Data** box. You will return to the **Chart Wizard** dialog box.

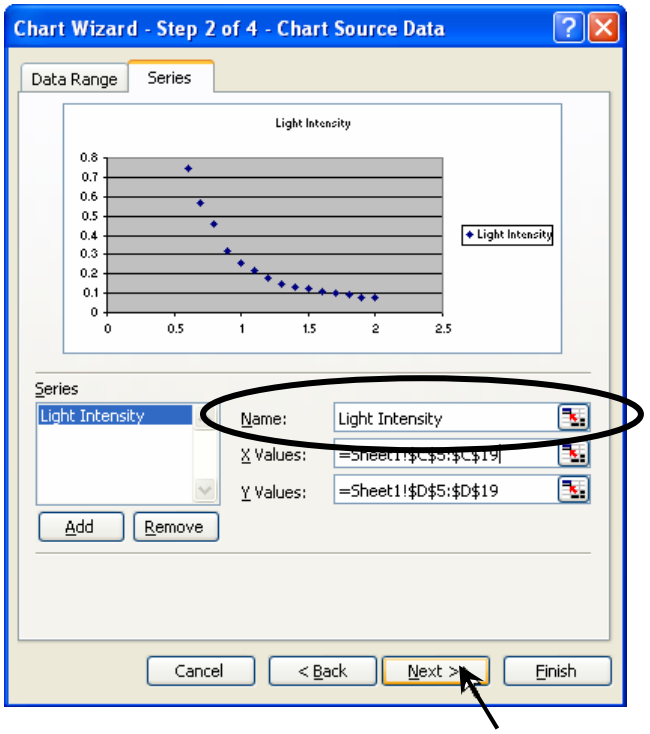


Distance (D) (m)	Intensity (I) (mW/cm^2)
0.6	0.7454
0.7	0.5657
0.8	0.4588
0.9	0.3199
1	0.2538
1.1	0.2149
1.2	0.1751
1.3	0.1479
1.4	0.1333
1.5	0.1236
1.6	0.11
1.7	0.0973
1.8	0.0906
1.9	0.0808
2	0.075

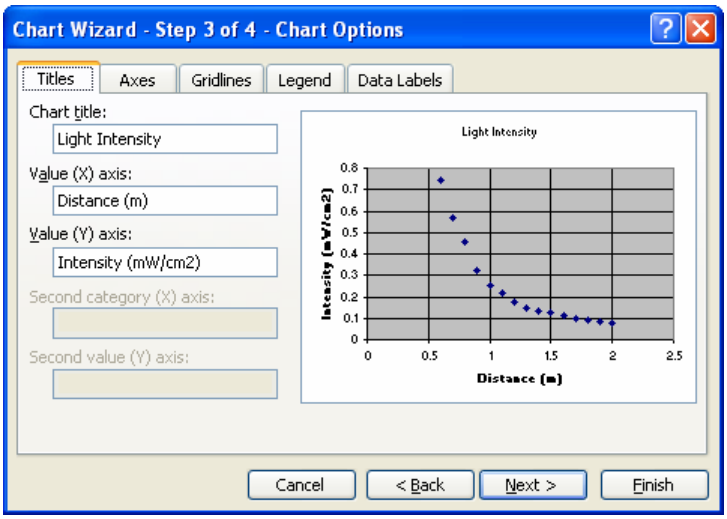
6. Click the **Series** tab to edit the source data features.



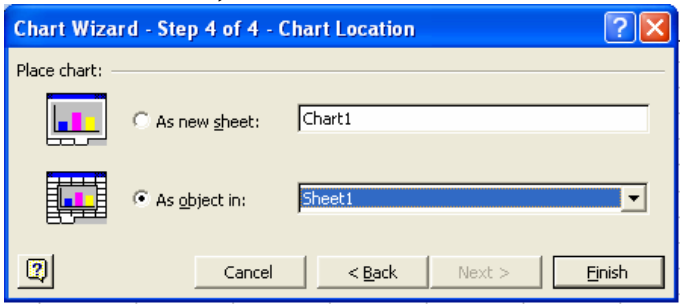
7. Give "Series 1" an appropriate name. Click inside the **Name** text box and type an appropriate name. In this example, we will use "Leg Length." Click **Next**.

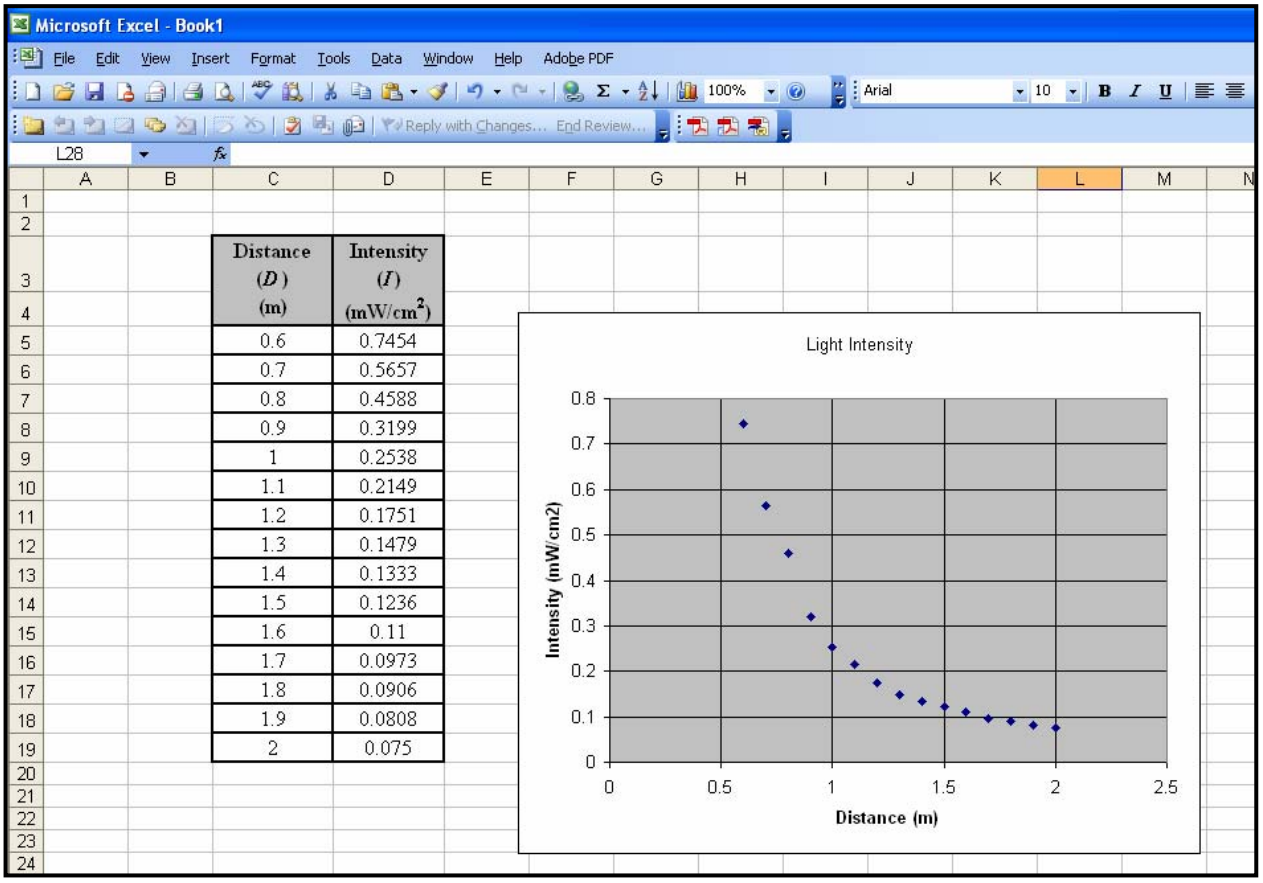


8. At this point you can customize the chart options, including the **Chart title**, **Value (*x*) axis**, and **Value (*y*) axis** labels. Enter the pertinent **Chart Options**, including appropriate labels for the x-axis and y-axis. You can also customize the axes, gridlines, legend, and data labels by clicking on the appropriate tab at the top of the dialog box. Click **Next** when you are ready to continue.



9. Select the location of the new chart, then click **Finish**.



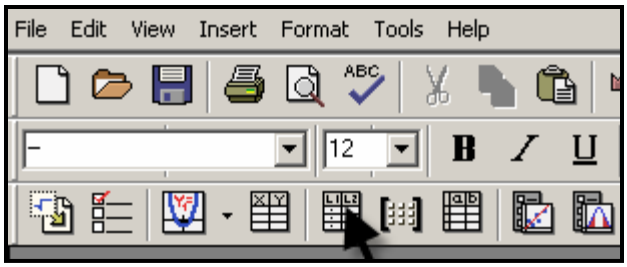


Distance (D) (m)	Intensity (I) (mW/cm^2)
0.6	0.7454
0.7	0.5657
0.8	0.4588
0.9	0.3199
1	0.2538
1.1	0.2149
1.2	0.1751
1.3	0.1479
1.4	0.1333
1.5	0.1236
1.6	0.11
1.7	0.0973
1.8	0.0906
1.9	0.0808
2	0.075

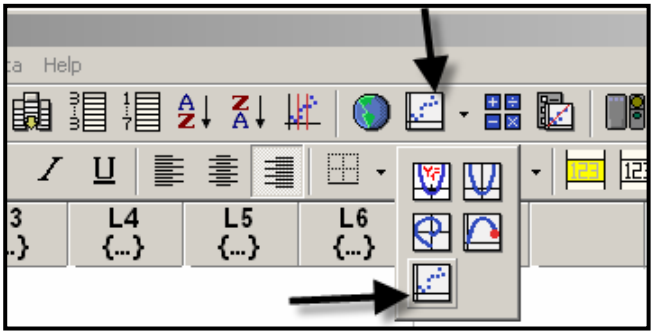
Generating a Scatterplot Using TI-Interactive

1. Open a new TI-Interactive document.

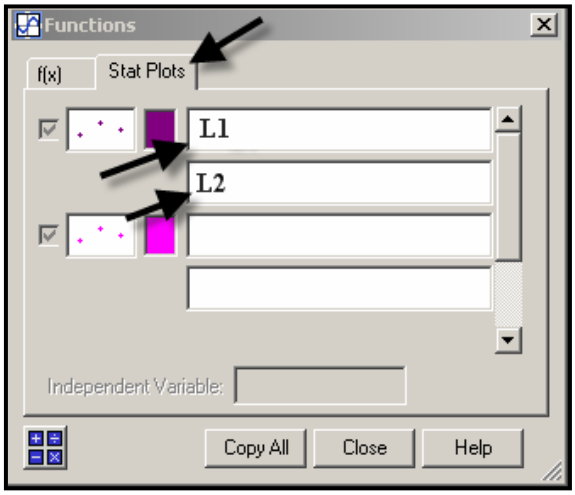
2. Select the list icon  from the scroll bar to activate the **DATA EDITOR**.



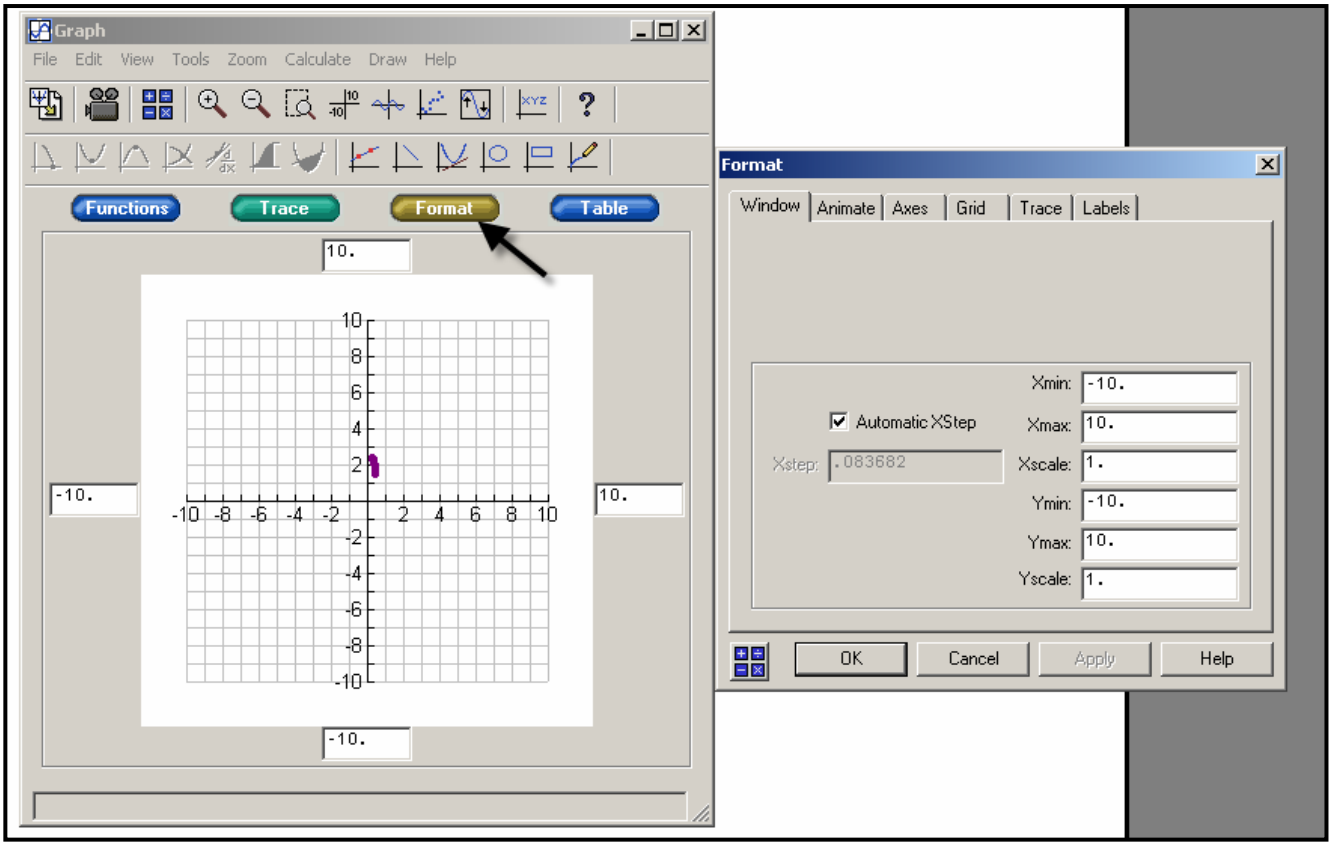
3. Create a scatterplot. Select the scatterplot icon  from the **DATA EDITOR** toolbar and from the drop down menu.



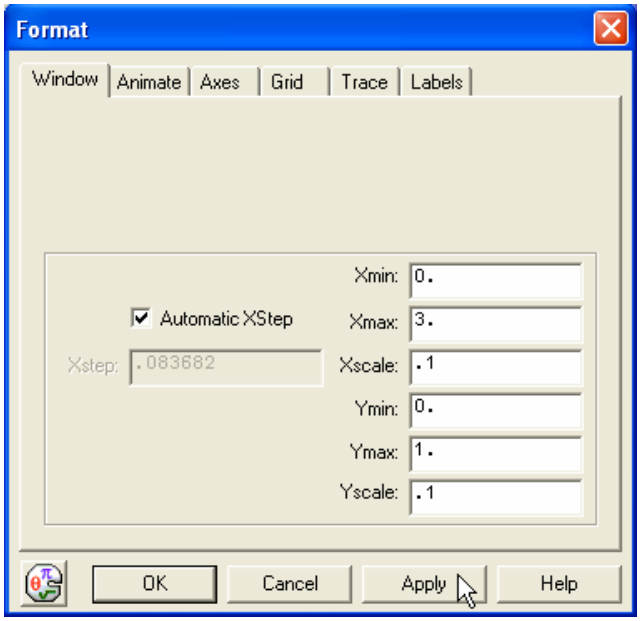
4. Click on the **STAT PLOTS** tab then enter the list names that contain the data, independent variable first and dependent variable second.



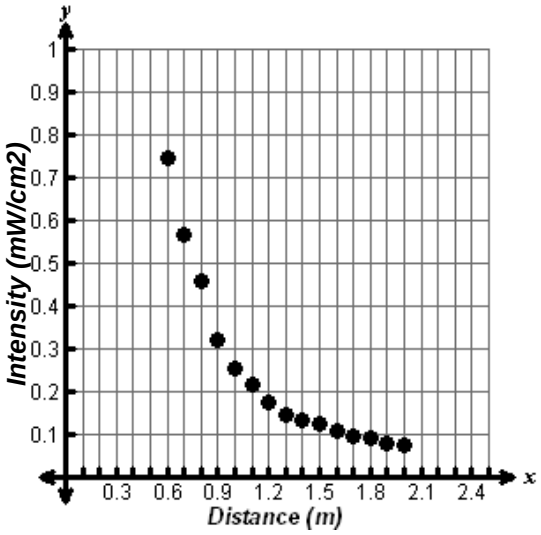
5. Set an appropriate window and label the axes by clicking the **FORMAT** button. In the **Window** tab, enter the appropriate domain and range for the function.



6. After entering the *Xmin*, *Xmax*, *Xscale*, *Ymin*, *Ymax*, and *Yscale*, click the **APPLY** button.



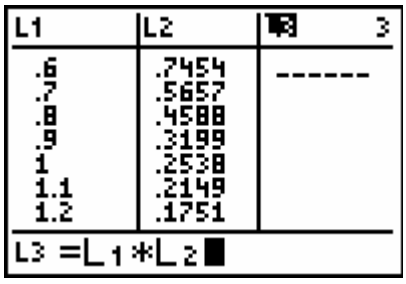
7. The scatterplot should be displayed with the specified domain and range.



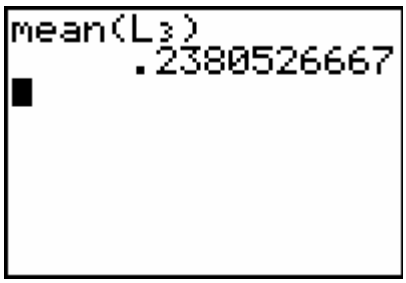
Determining a Function Rule Using a Graphing Calculator

1. The graph appears to be an inverse variation function, $y = \frac{k}{x}$, so multiply *xy* to find *k*, the constant of variation.

   Go to the List Editor by pressing [STAT] [ENTER]. Use [▼] [▲] to select the List 3 header. Enter the formula [L3] = [L1] [L2] by pressing [2nd] [1] [×] [2nd] [2]. Press [ENTER].

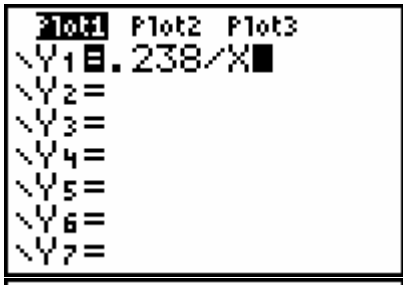


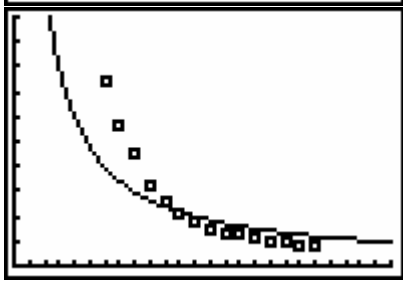
2. Find the average value of List 3 by returning to the home screen and using List operations. Press [2nd] [MODE]. Press [2nd] [STAT] [▶] [▶] [3]. Enter [L3] by pressing [2nd] [3], then press [ENTER].



3. Substitute this value of *k* into the parent function and verify using a graph.

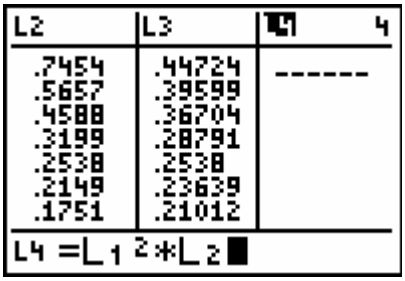
   Press [Y=] then enter the function. Press [GRAPH] to view the graph.



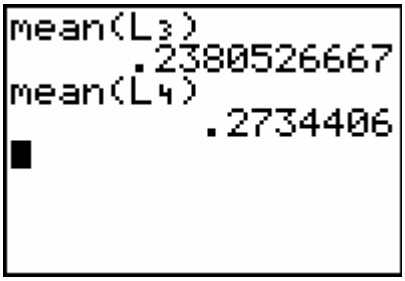


4. This function is not a good fit. Try inverse-square variation, $y = \frac{k}{x^2}$. Multiply $x^2 y$ in order to find an approximate value for *k*, the constant of variation.

   Go to the List Editor by pressing [STAT] [ENTER]. Use [▼] [▲] to select the List 4 header. Enter the formula [L4] = [L1]^2 [L2] by pressing [2nd] [1] [x^2] [×] [2nd] [2]. Press [ENTER].

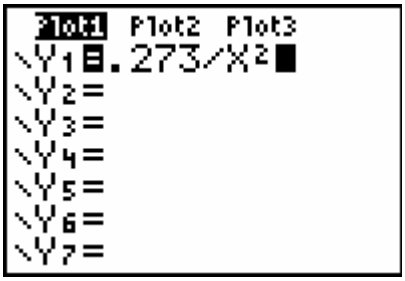


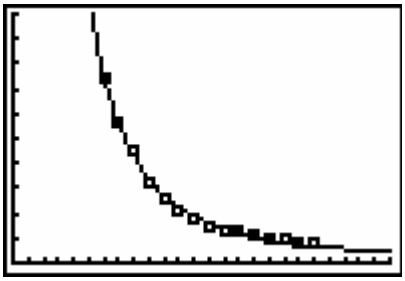
5. Find the average value of List 4 by returning to the home screen and using List operations. Press [2nd] [MODE]. Press [2nd] [STAT] [▶] [▶] [3]. Enter [L4] by pressing [2nd] [4], then press [ENTER].



6. Substitute this value of *k* into the parent function and verify using a graph.

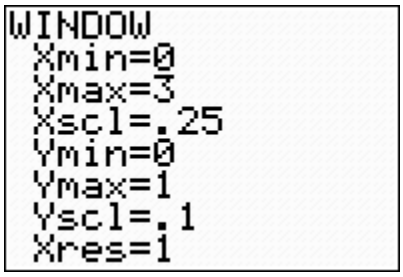
   Press [Y=], then enter the function. Press [GRAPH] to view the graph.



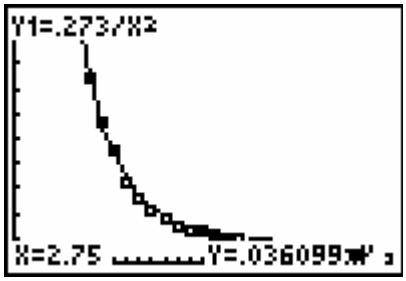


Using the Graph to Make Predictions

1. Press [WINDOW] to enlarge the window. Adjust the settings to make the window large enough to predict with.



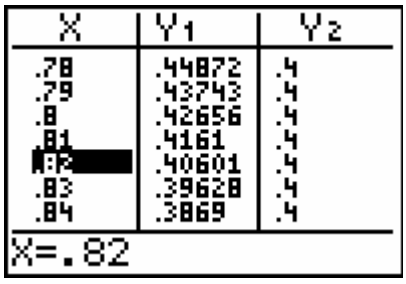
2. Press [GRAPH] then [TRACE]. Press [▲] to select the function then trace to the prediction using the right and left arrow keys, [◀][▶].



Using the Table to Make Predictions

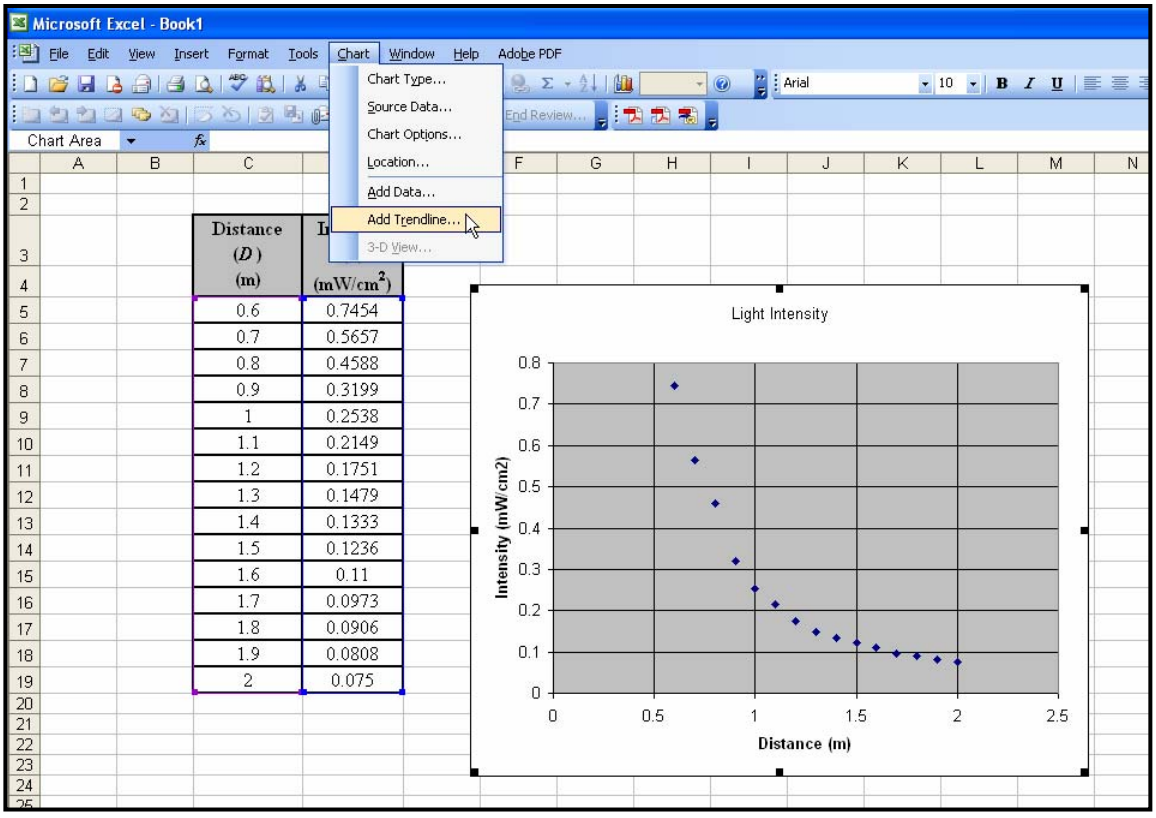
1. Press [2nd] [WINDOW]. Enter values for TblStart and ΔTbl, the value of the *x* increment.

2. Press [2nd] [GRAPH]. Use the up and down arrow keys, [▲] and [▼], to scroll to the desired value.

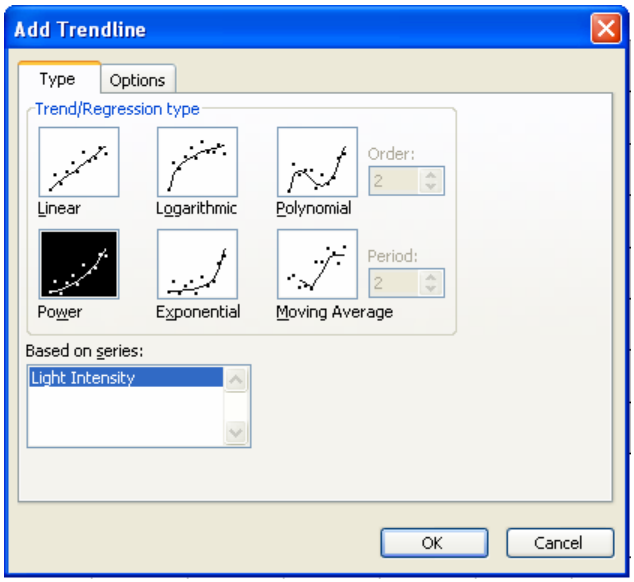


Determining a Function Rule Using Microsoft Excel

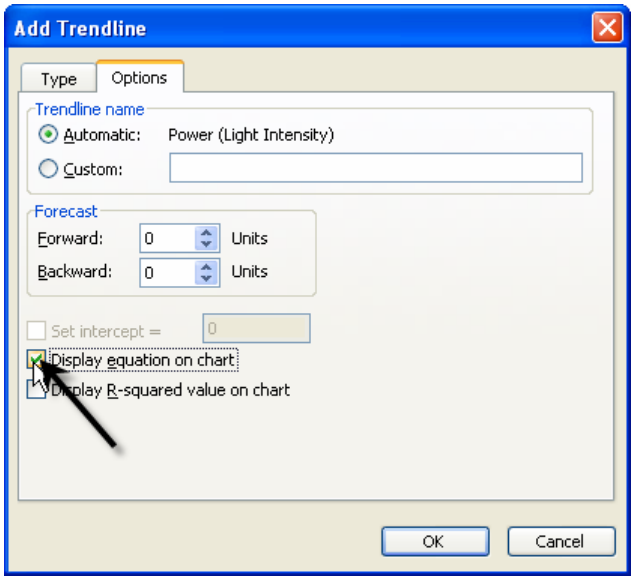
1. Click to select your chart. Choose **Add Trendline** from the **Chart** menu.



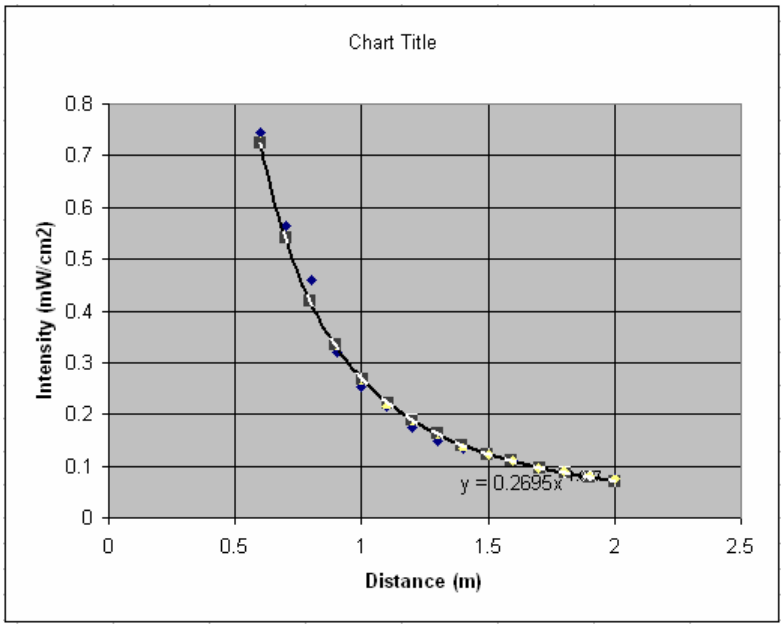
2. The **Add Trendline** dialog box will appear. Click on the **parent function** for the trendline you wish to graph. If you select **Polynomial** or **Moving Average**, be sure to select the order or period, respectively.

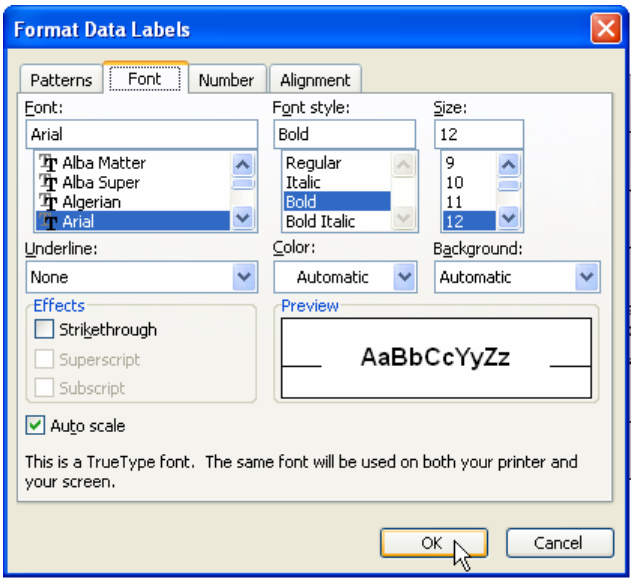


3. Click on the **Options** tab. Click on the **Display equation on chart** check box. Set any other features that you would like to customize related to your trend line. Click **OK**.



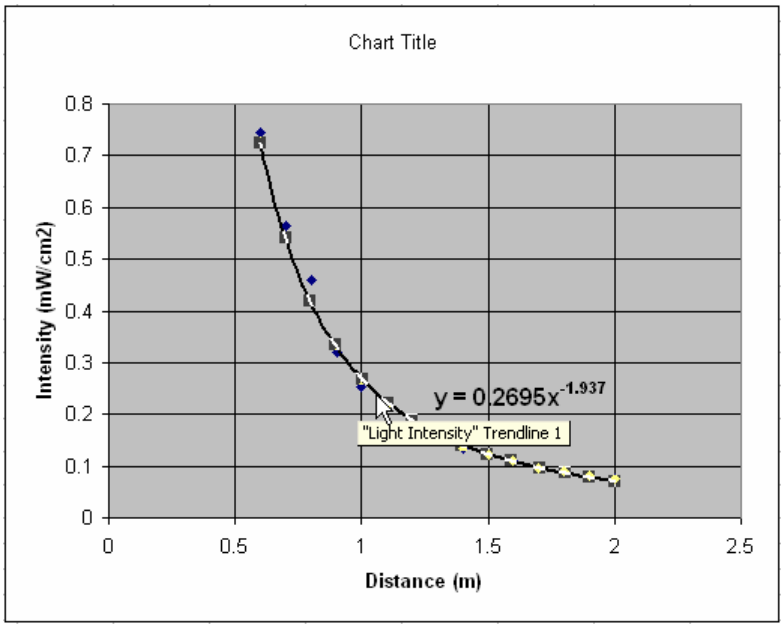
4. Customize the appearance of the equation by double-clicking on the equation. The **Format Data Labels** dialog box will appear. You can change the appearance of the equation, including font, number, and alignment. Click **OK** when you are finished.



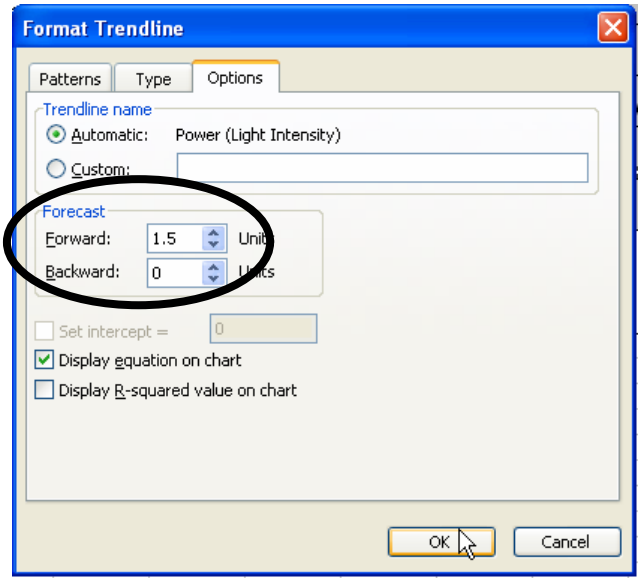


Using the Graph to Make Predictions

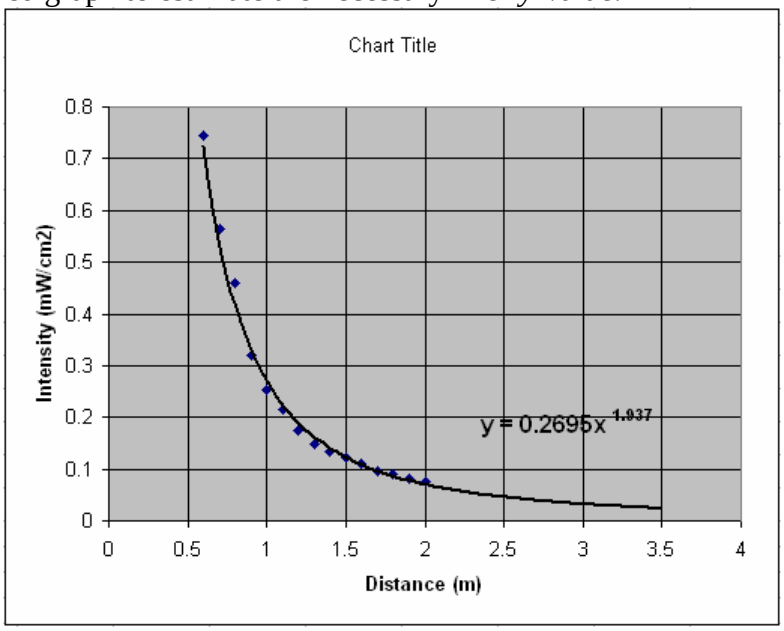
1. Double-click the trendline on your chart. The Format Trendline dialog box will appear.



2. Click the **Options** tab. In the **Forecast** text boxes, enter the number of units that you would like to extend the graph either **Forward** or **Backward** beyond your data set. Click **OK**.

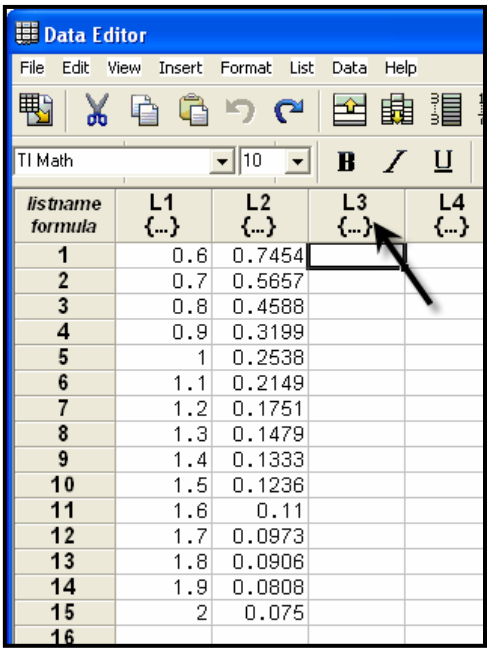


3. Use the extended graph to estimate the necessary *x*- or *y*-value.



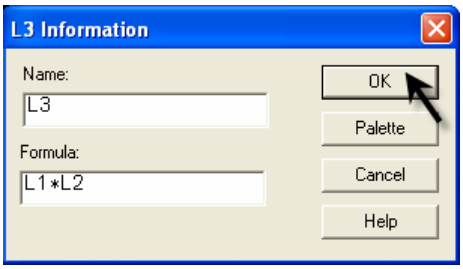
Determining a Function Rule Using TI-Interactive

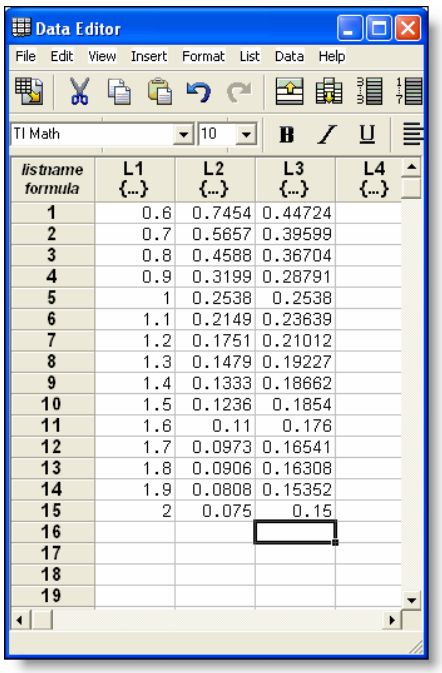
1. The graph appears to be an inverse variation function, $y = \frac{k}{x}$, so multiply *xy* to find *k*, the constant of variation then find the average value. In the **Data Editor**, click the **Formula** tab under the List 3 header.



	L1	L2	L3	L4
1	0.6	0.7454		
2	0.7	0.5657		
3	0.8	0.4588		
4	0.9	0.3199		
5	1	0.2538		
6	1.1	0.2149		
7	1.2	0.1751		
8	1.3	0.1479		
9	1.4	0.1333		
10	1.5	0.1236		
11	1.6	0.11		
12	1.7	0.0973		
13	1.8	0.0906		
14	1.9	0.0808		
15	2	0.075		
16				

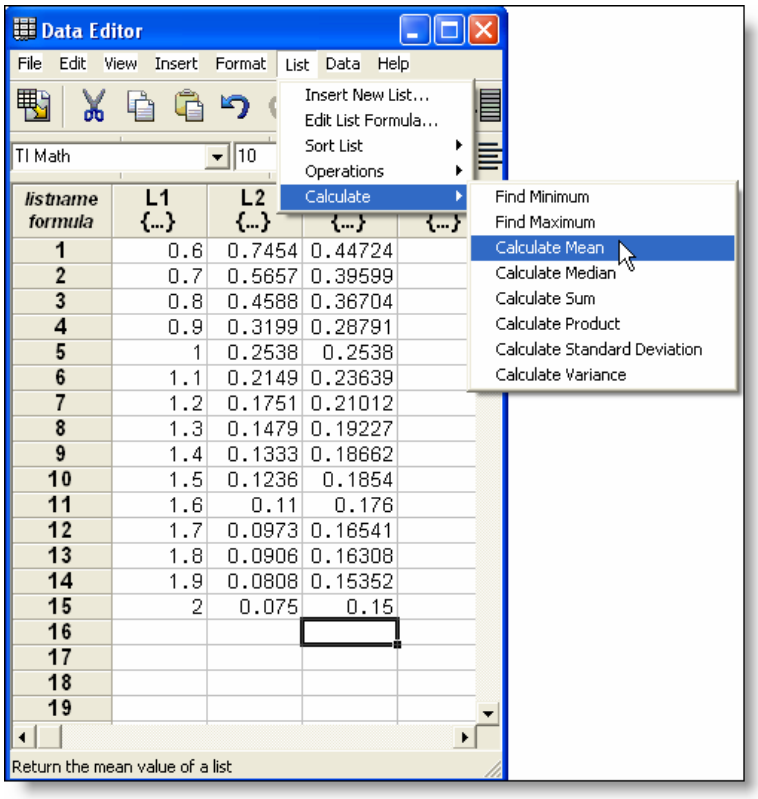
2. Enter the formula **L1*L2** inside the **Formula**: text box. Click **OK**.



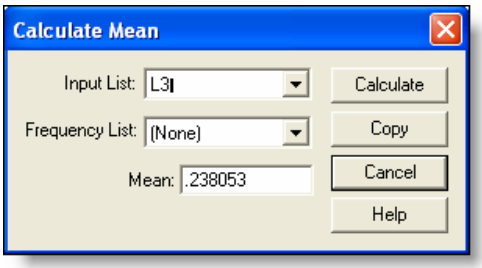


	L1	L2	L3	L4
1	0.6	0.7454	0.44724	
2	0.7	0.5657	0.39599	
3	0.8	0.4588	0.36704	
4	0.9	0.3199	0.28791	
5	1	0.2538	0.2538	
6	1.1	0.2149	0.23639	
7	1.2	0.1751	0.21012	
8	1.3	0.1479	0.19227	
9	1.4	0.1333	0.18662	
10	1.5	0.1236	0.1854	
11	1.6	0.11	0.176	
12	1.7	0.0973	0.16541	
13	1.8	0.0906	0.16308	
14	1.9	0.0808	0.15352	
15	2	0.075	0.15	
16				
17				
18				
19				

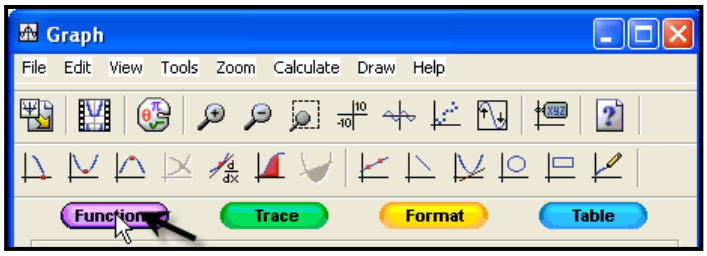
3. From the **List** menu, choose **Calculate**, then choose **Calculate Mean**.



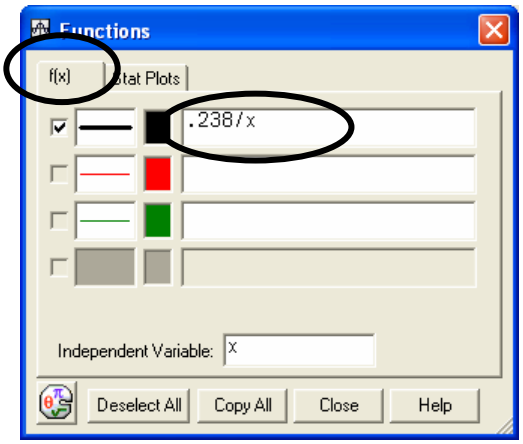
4. From the **Input List** drop-list box, choose **L3**. Click **Calculate**.

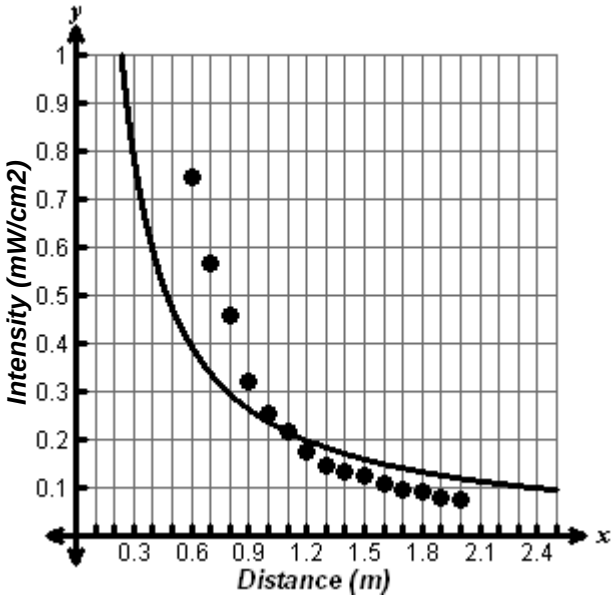


5. Substitute this value of *k* into the parent function and verify using a graph. From your Scatterplot, click the **Functions** button.

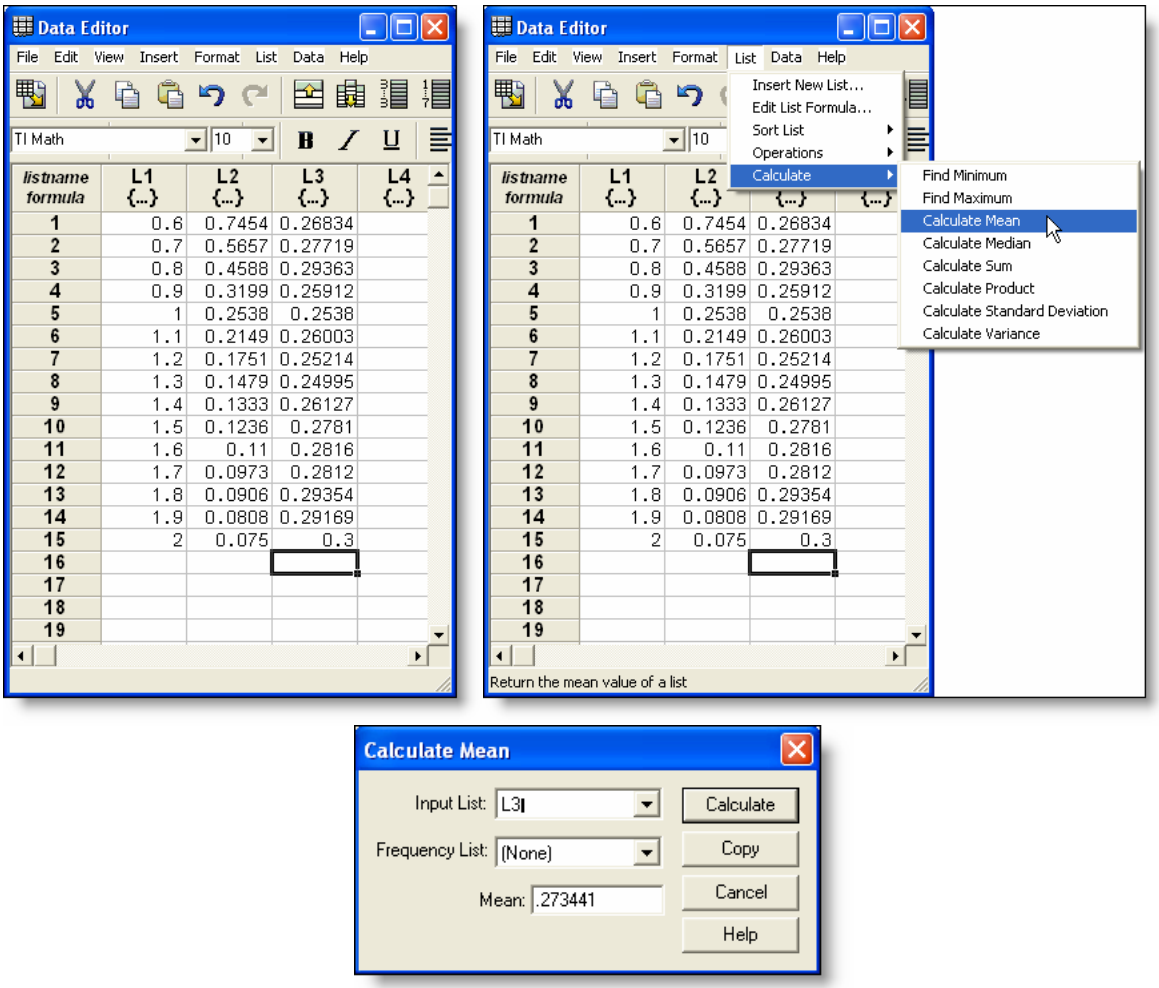


Inside the **Functions** dialog box, click the **f(x)** tab, then enter your function in the top text box. Click **Close** when complete.





6. This function is not a good fit. Try inverse-square variation, $y = \frac{k}{x^2}$. Multiply $x^2 y$ in order to find an approximate value for *k*, the constant of variation. In the **Data Editor**, clear **L3** then repeat Steps 1 through 5. Set **L3 = (L1)^2 × L2** by following steps 1 and 2. Find the average value of L3 by following Step 3.



Graph the function over the scatterplot, substituting the average value of L3 for *k*.