

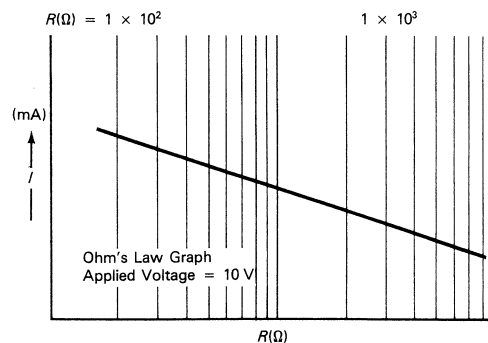
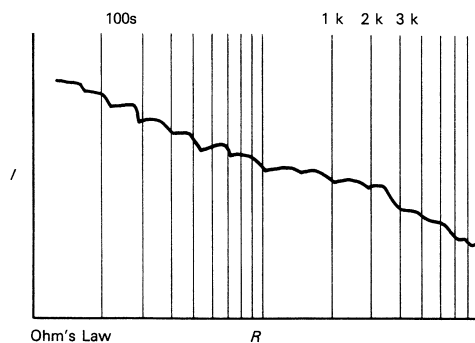
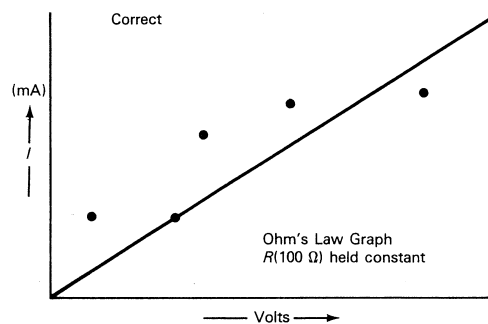
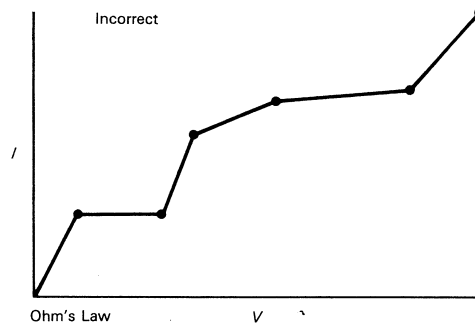
Appendix: Plotting Graphs using Excel

A graph usually shows the relationship of two or more variables. The relationship is actually a curve or a line that results.

When you plot a graph:

1. Be neat and complete. Make it large.
2. Never connect points with lines. Always show the characteristic of the curve based on physics theory or your prediction.
3. There should be room in the margins to title the graph.
4. Use the fullest scale possible. Do not confine a graph in a small area.

Examples



Excel for Physics (I) Ver 2016

In this appendix, Drawing a straight line graph (linear regression) will be explained.
Follow the procedure to draw graph 5 with excel.

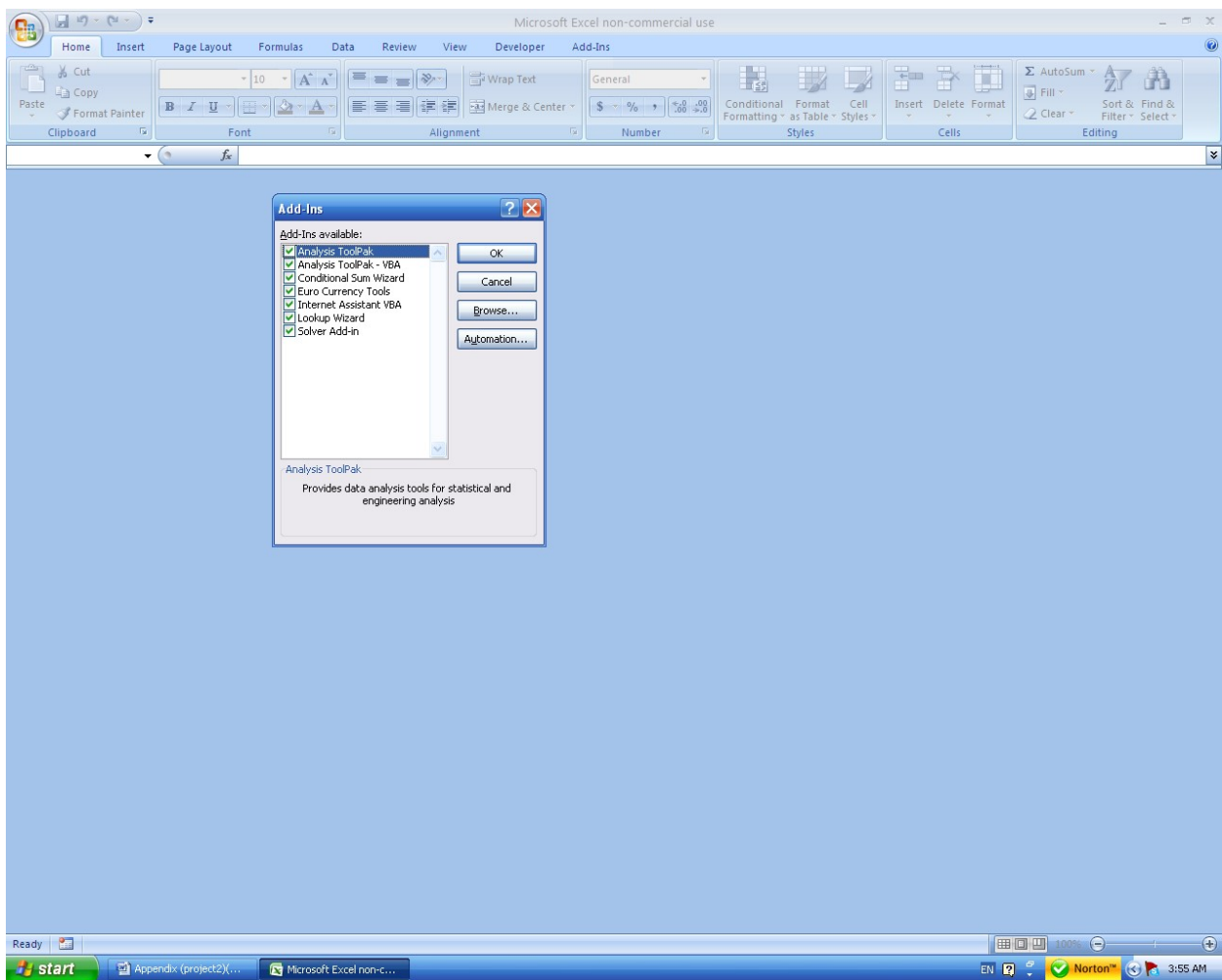
1. Open Excel.

Note:

In order to use some analytical tools of EXCEL, you need to add them.

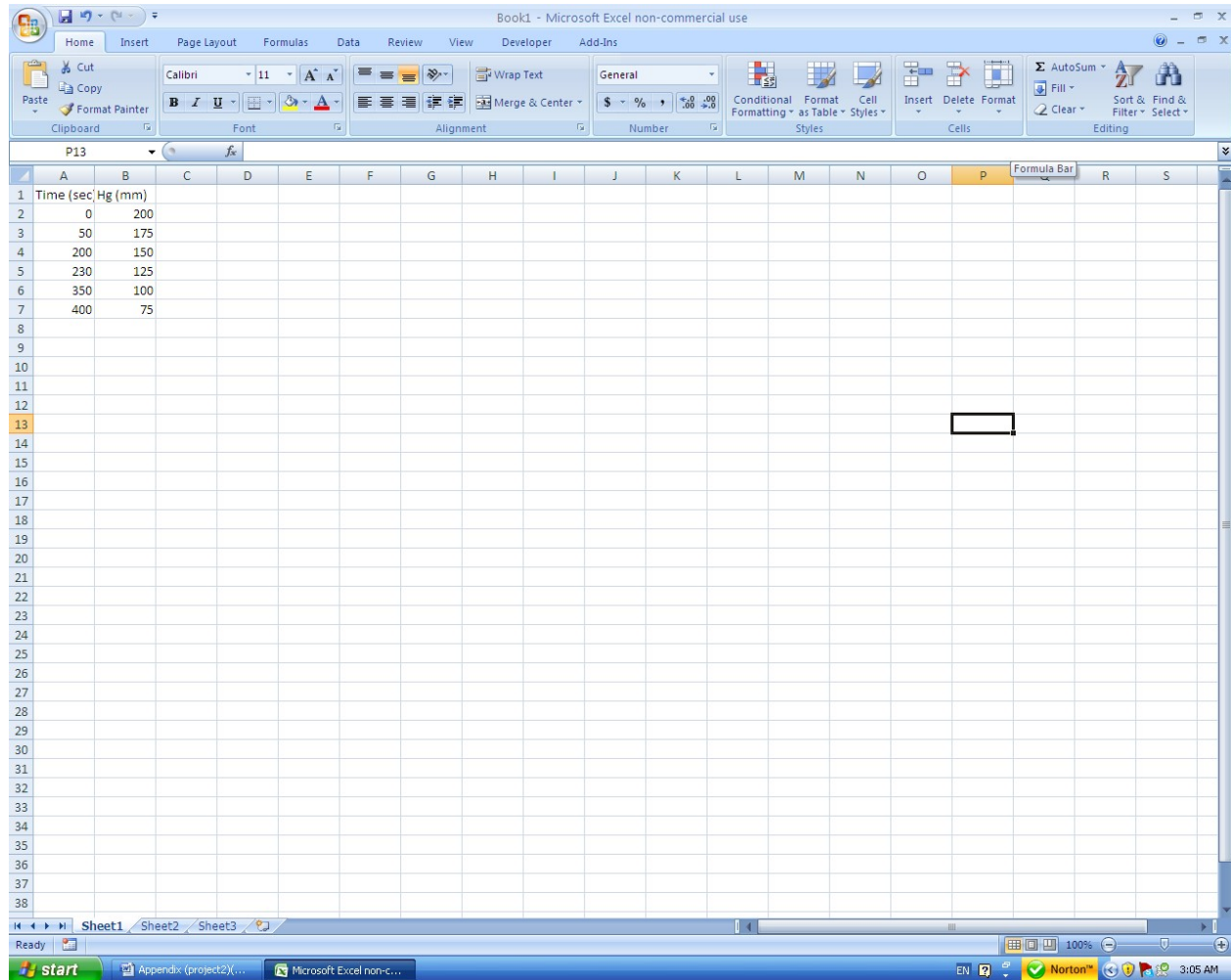
[Office Button] => [Excel Options] => [Add Ins] to make sure at least “Analysis ToolPak” and “Analysis ToolPak-VBA” and “Solver add-in” are added.

If not, [Office Button] => [Excel Options] => [Add Ins] => [Go] on [Excel add-in].
The [Add-in] window appears. Select them all.

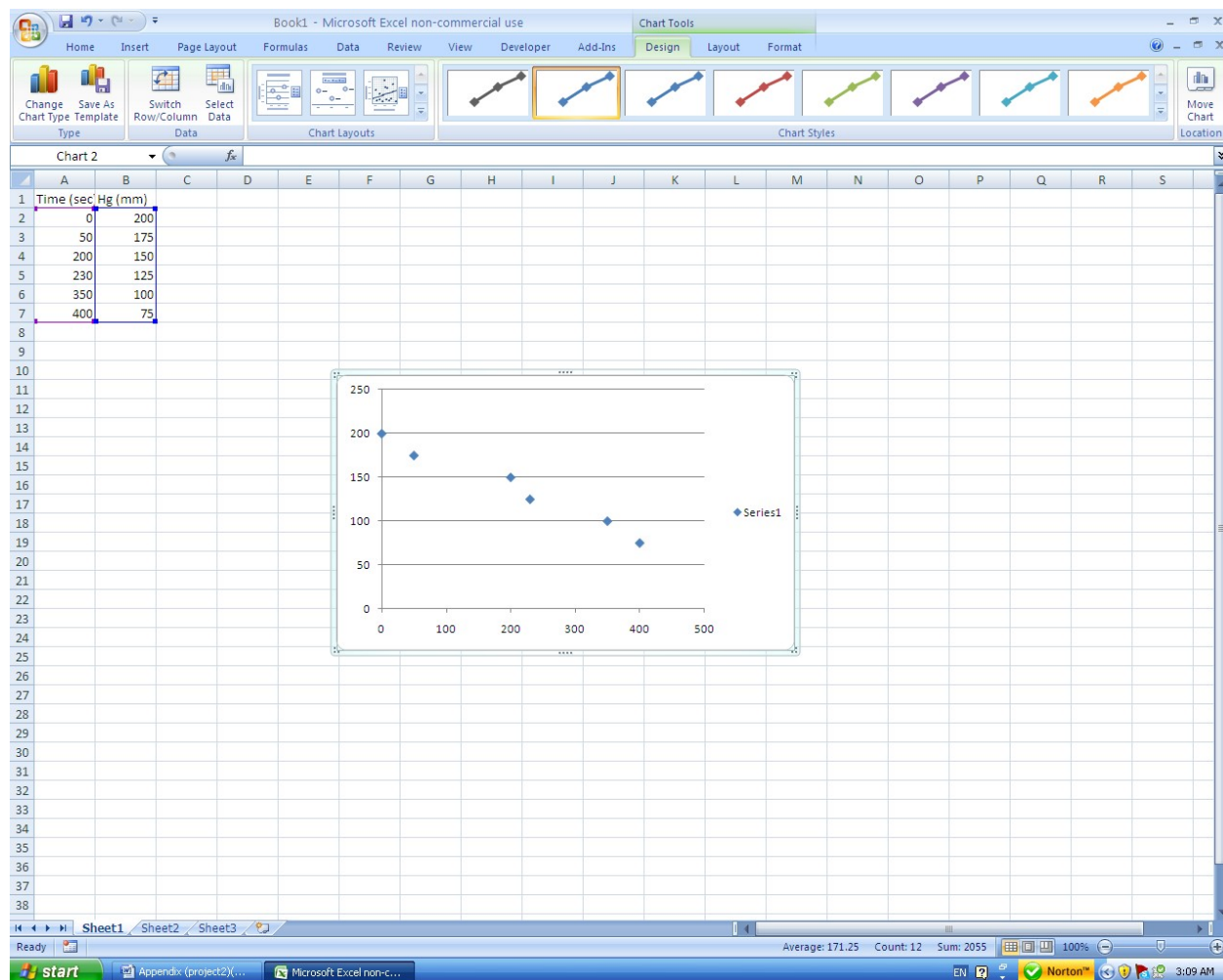


2. Enter the data as follows:

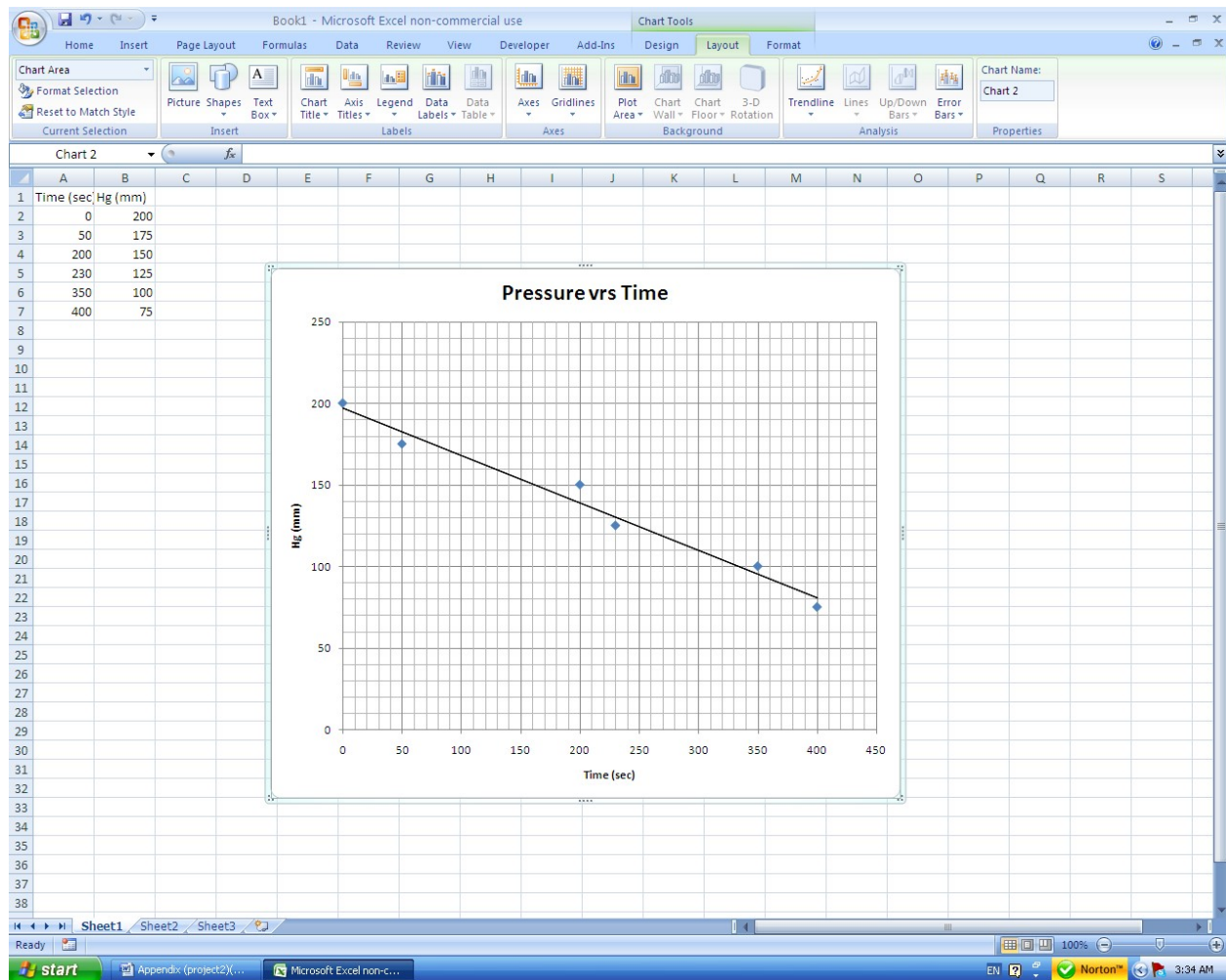
Note: (Column A, Column B) will be read as (x, y) data



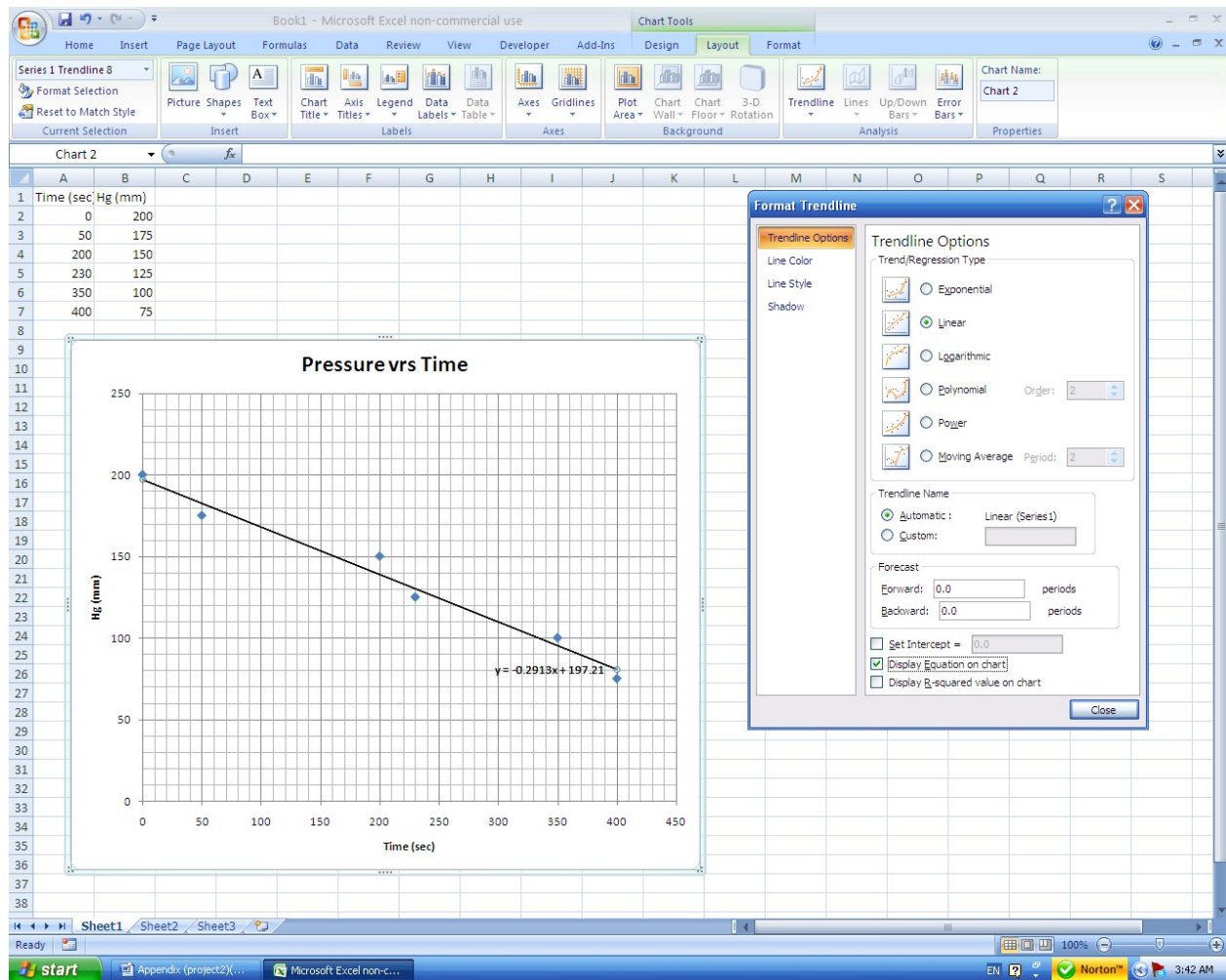
3. Highlight the data and select [Insert] => [Chart] => [Scatter]. You will get the following screen:



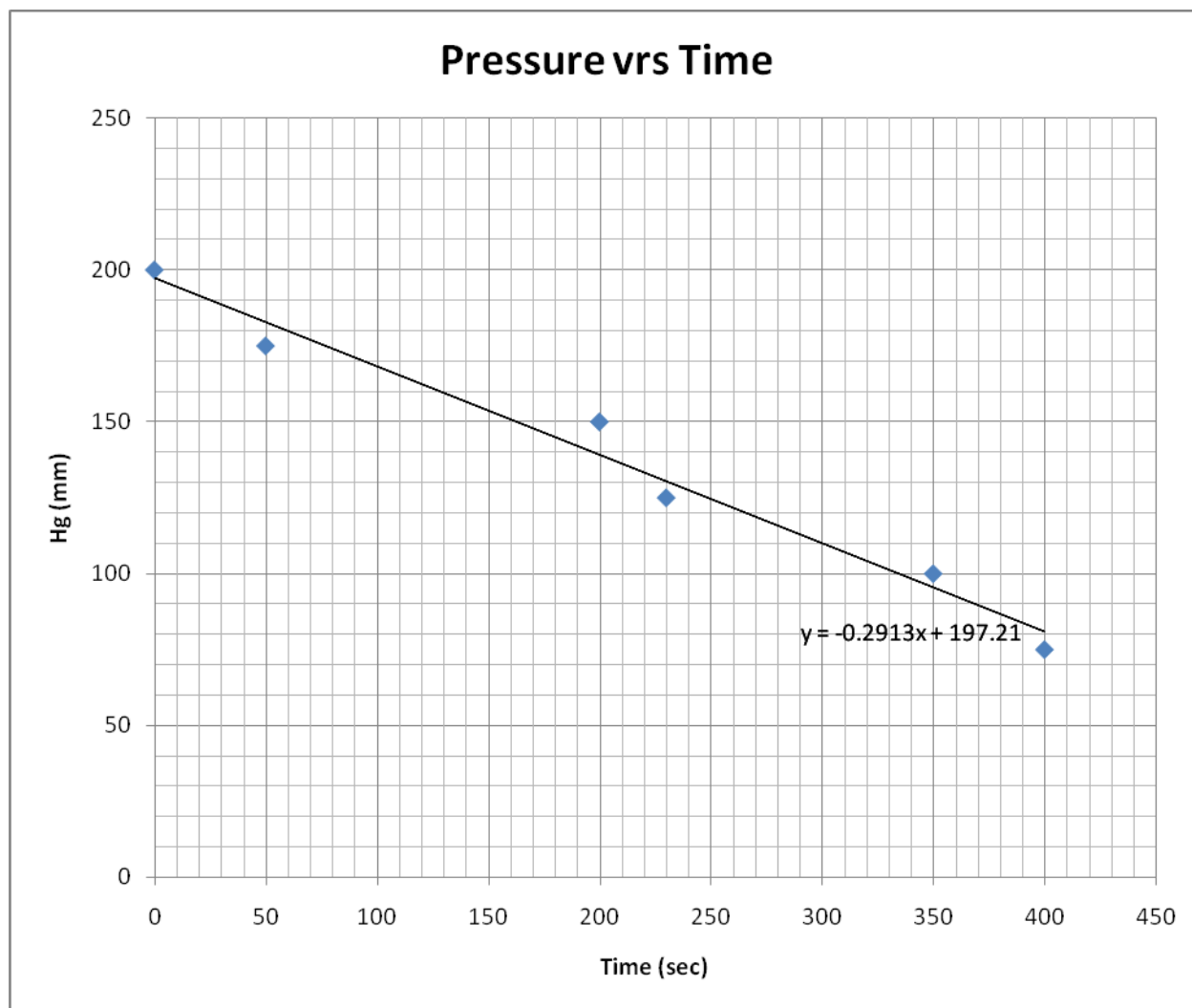
4. Single-click one of the data point on the graph for fitting routine.
Then [Chart Tools] appears.
5. [Chart Tools] => [Design] => [Add Chart Element] to add the axes, and the title.
6. [Chart Tools] => [Design] => [Add Chart Element] => [Trend Line] => [Linear Trendline]



7. [Chart Tools] => [Design] => [Add Chart Element] => [Trend Line].
 Select [More Trendline Options] to pull down the menu of the Trendline.
 The [Format Trendline] window opens.
 Check [Display Equation on Chart] to display the best fit equation.



NOTE: You can cut & paste the graph you created to a WORD file.

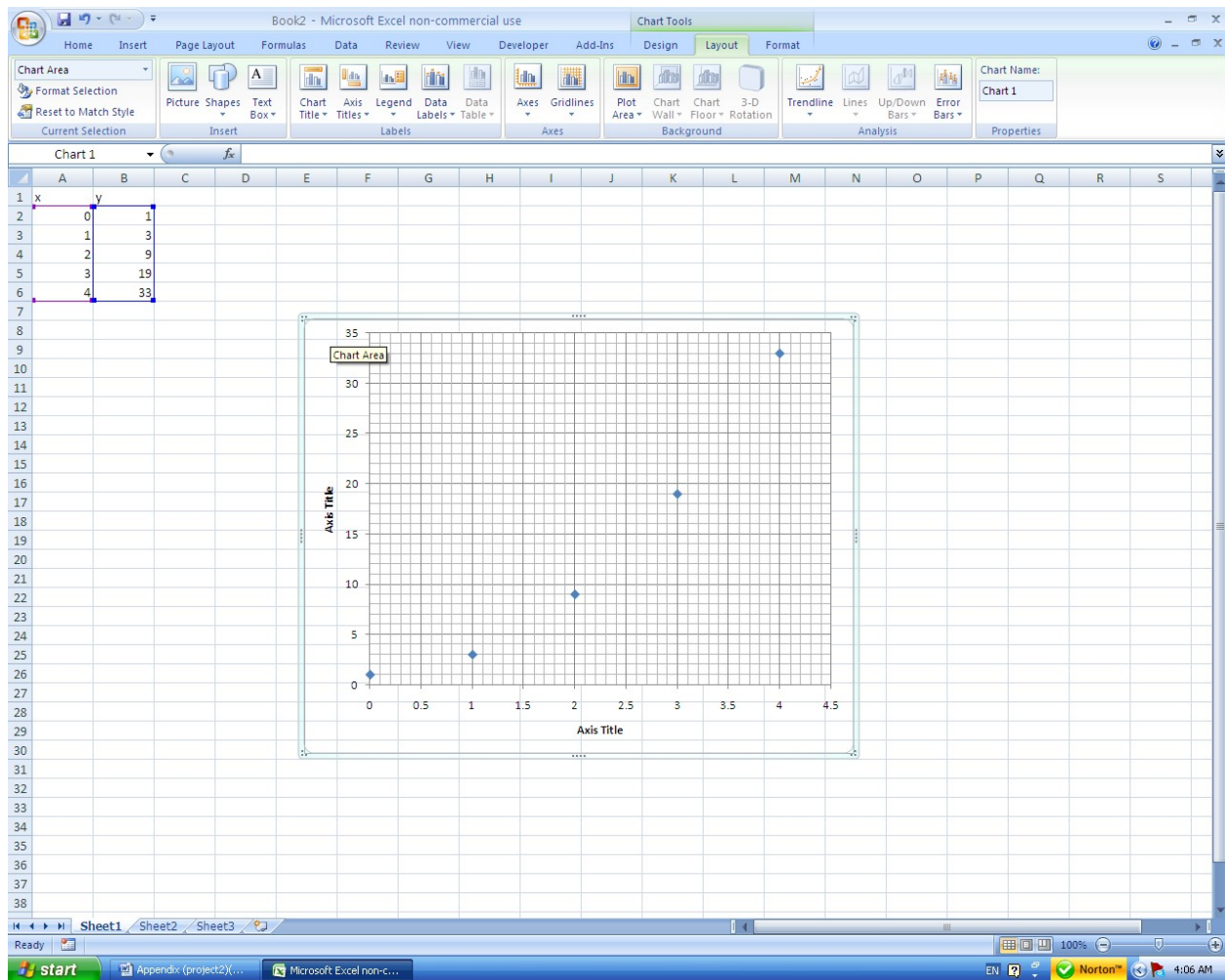


Save your result.

Non-linear Fitting:

Excel has several non-linear curve fitting in the [Add Trendline...] menu. We will put the example:

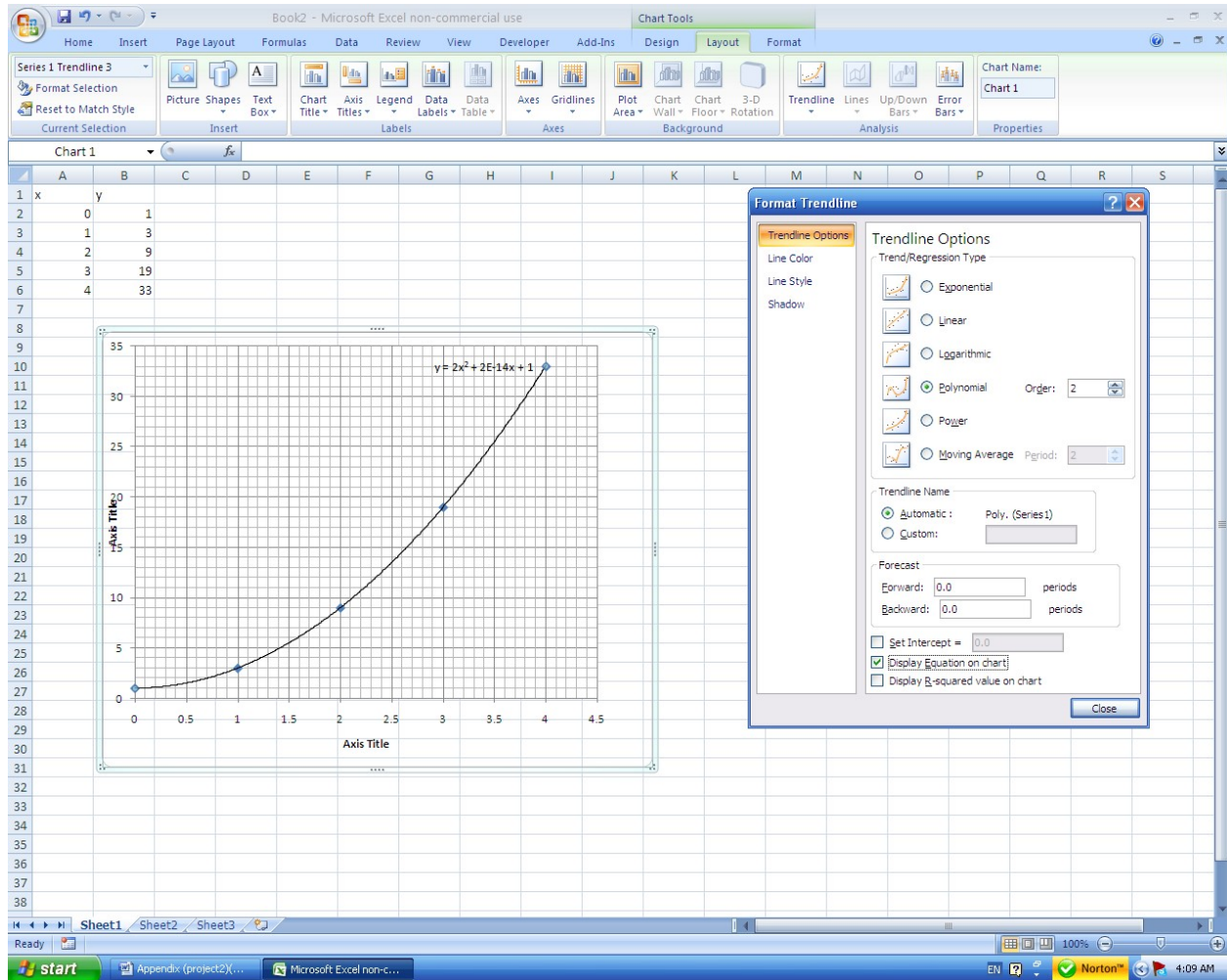
x	y
0	1
1	3
2	9
3	19
4	33



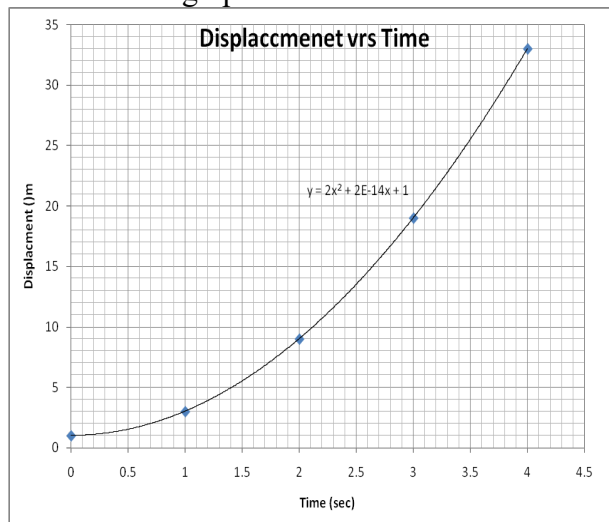
The graph looks like a parabola, and thus we will try $y = ax^2 + bx + c$.

8. Click one data points, and activate the [Chart Tools].
9. [Chart Tools] => [Design] => [Add Chart Tools] => [Trend Line].
Select [More Trendline Options] to pull down the menu of the Trendline.
The [Format Trendline] window opens.

Click [Polynomial] and set the [Order] 2.
Check [Display Equation on Chart] to display the best fit equation.



Label the axes, and add the title of the graph.



Wait!

This graph is not correct because at time = 0, the displacement should be zero.

10. Select [More Trendline Options] to pull down the menu of the Trendline.

The [Format Trendline] window opens.

Click [Polynomial] and set the [Order] 2.

Check [Display Equation on Chart] to display the best fit equation.

Also, check [Set intercept = 0.0].

More reasonable graph will appear.

