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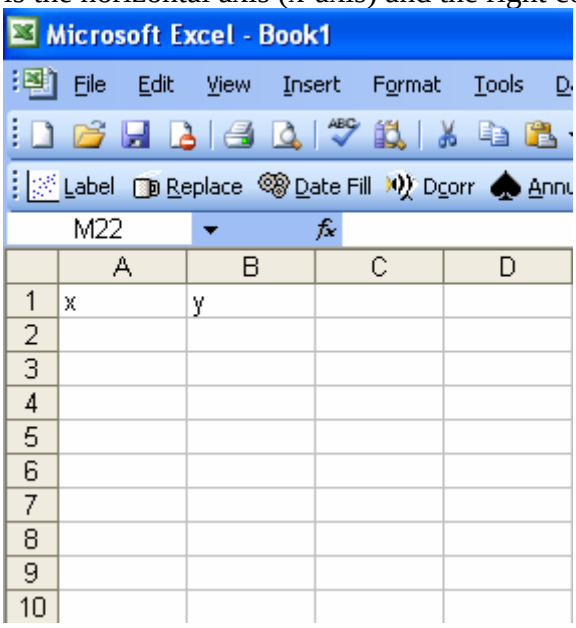
Instructions for Excel

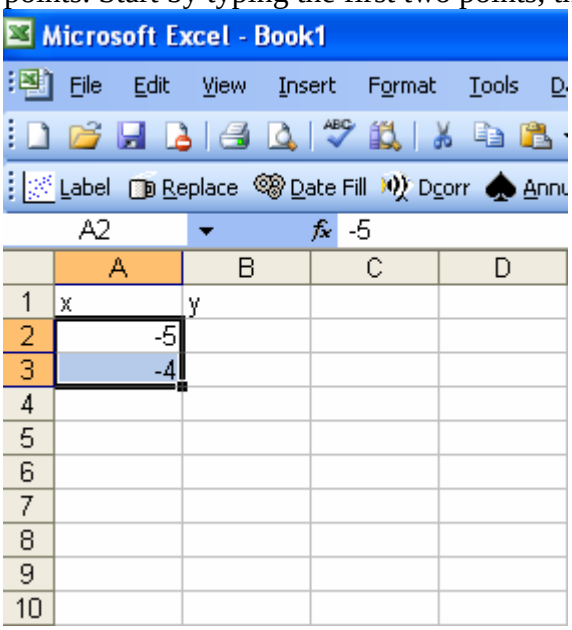
1. Plotting analytical function.

Suppose that you need to plot the graph of a function $f(x) = x^2$ on the interval $[-5,5]$.

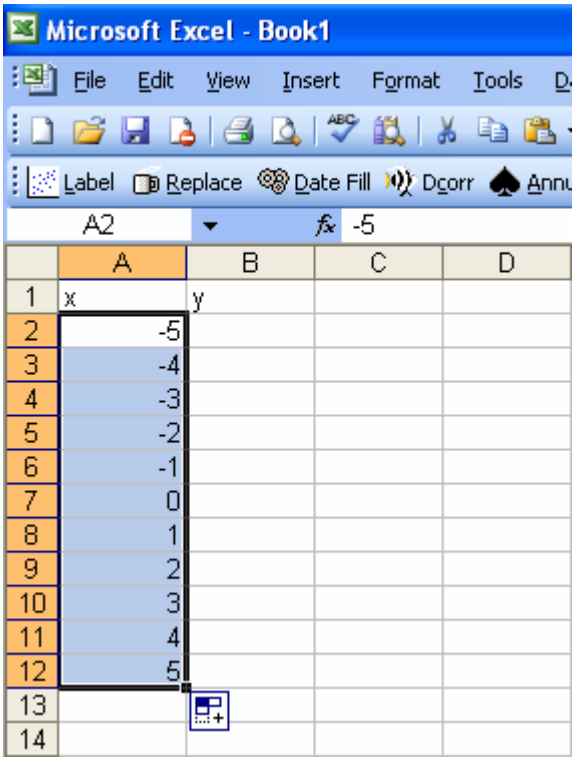
Step – 1: make titles for the x-axis and the y-axis. Excel understands that the left column is the horizontal axis (x-axis) and the right column is the vertical axis (y-axis).



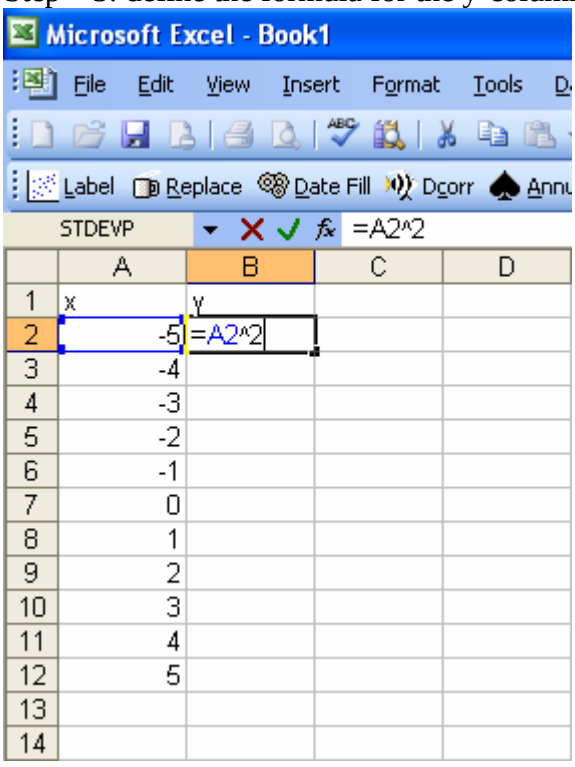
Step – 2: provide values for the x variable (-5, -4, …, 4, 5). You don't have to type all the points. Start by typing the first two points, then select (highlight) the cells with -5 and -4:



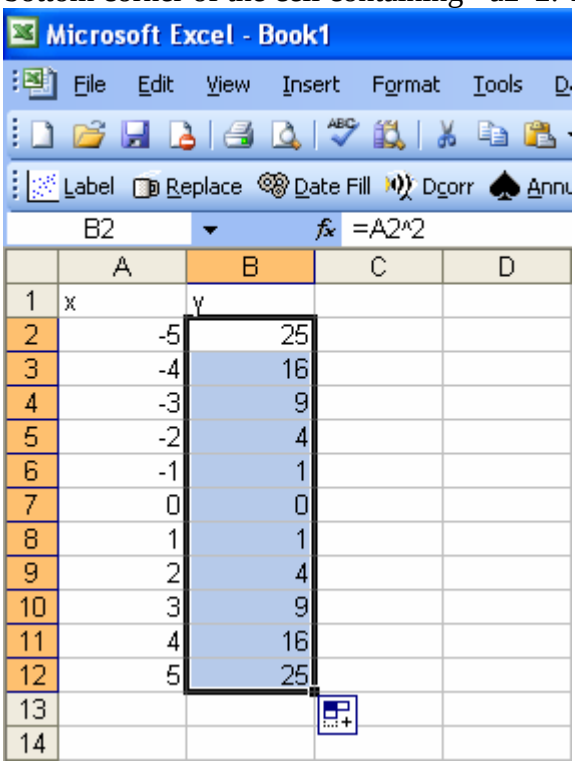
Then point with the cursor on the right bottom corner of the cell with –4 and drag down until you get



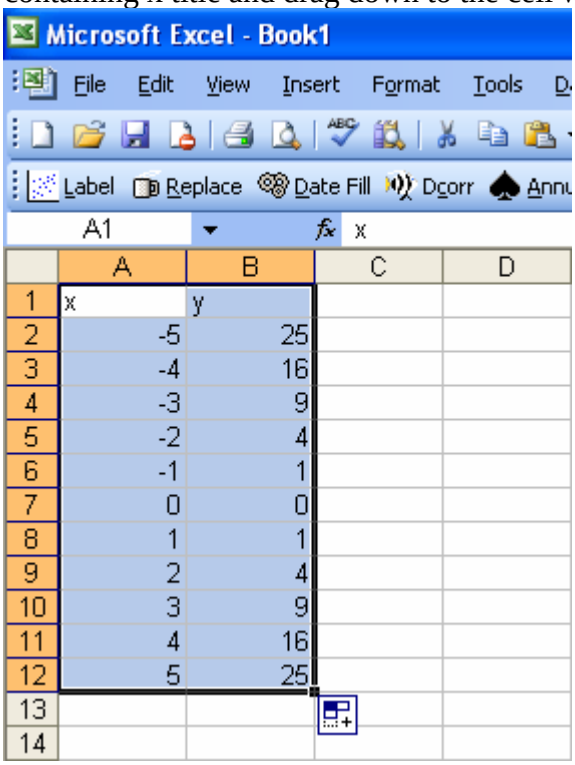
Step – 3: define the formula for the y-column. Suppose that the cell with –5 is A2. Write



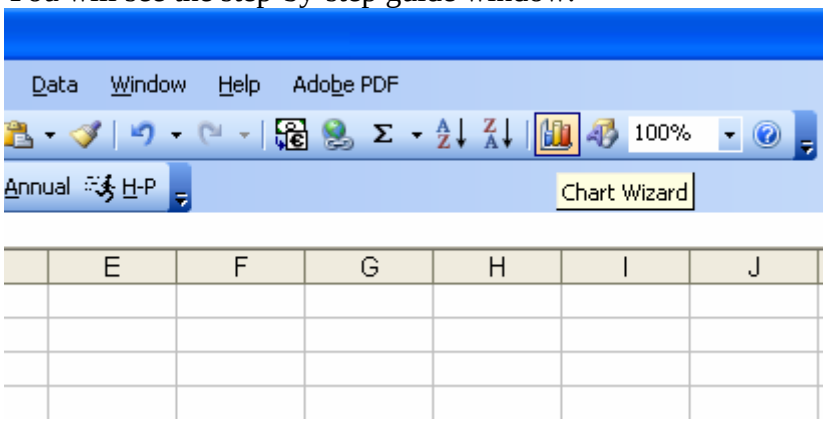
Step – 4: apply the formula to all the points in the x-column by dragging down the right bottom corner of the cell containing =a2^2. The result is



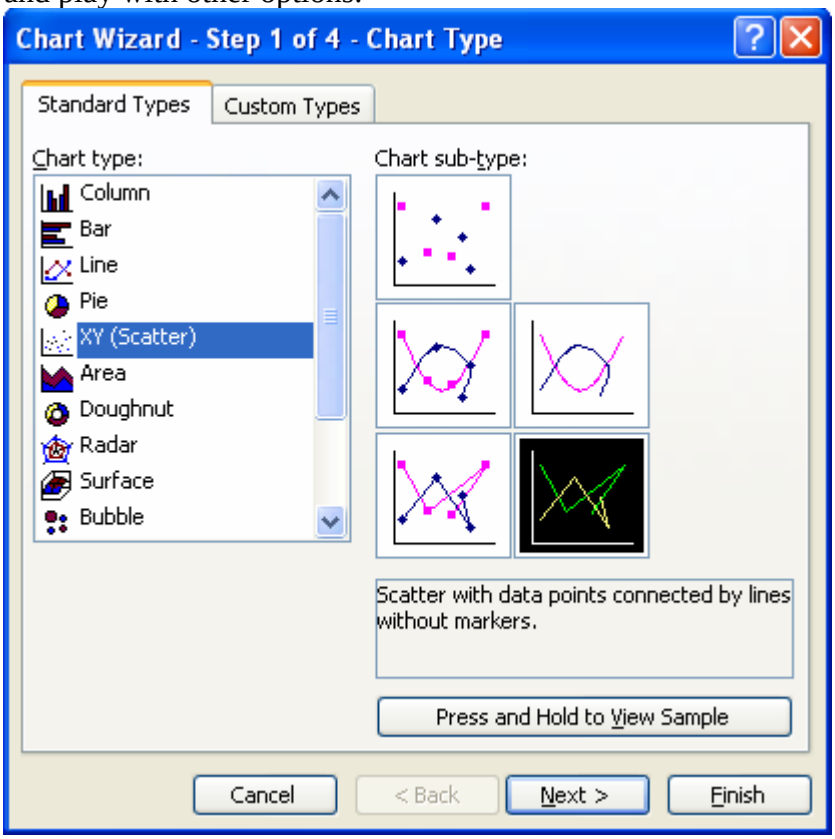
Step – 5: highlight all the cells with the variables **and the titles**. Put the cursor on the cell containing x title and drag down to the cell with 25. The result is



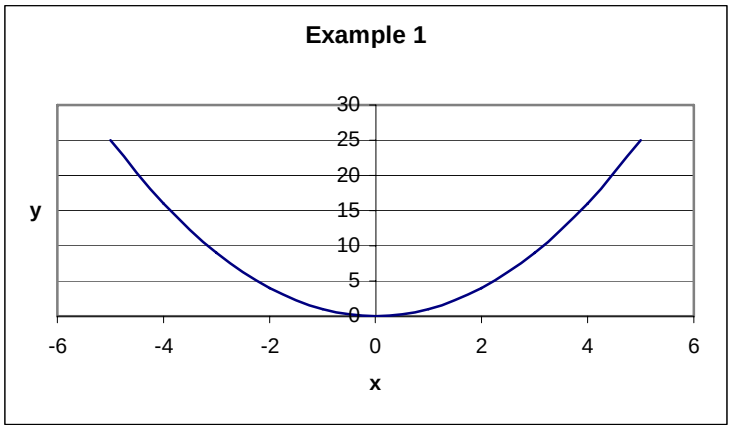
Step – 6: choose the “chart wizard” icon (the one with blue, yellow and red columns). You will see the step-by-step guide window.



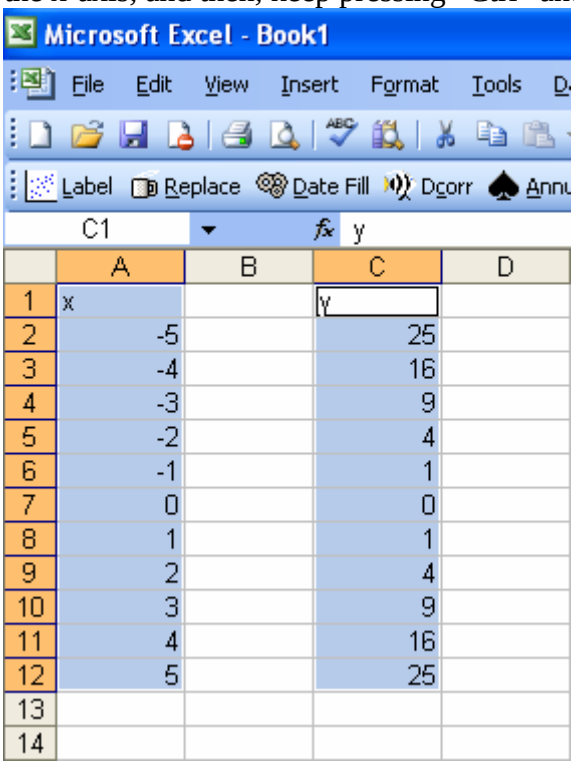
Step – 7: choose XY (scatter) and line graph from the chart sub-type. You can add titles and play with other options.



The result is roughly



Remark: If the data is not in adjacent columns, press “Ctrl” and use mouse to highlight the x-axis, and then, keep pressing “Ctrl” and highlight the y axis.

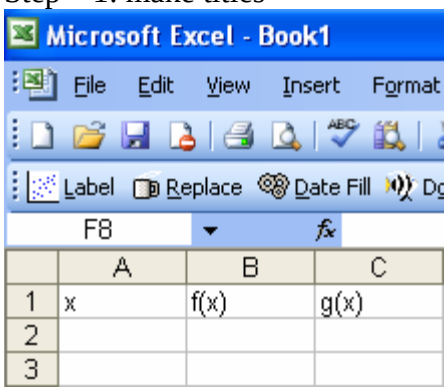


	A	B	C	D
1	x		y	
2	-5		25	
3	-4		16	
4	-3		9	
5	-2		4	
6	-1		1	
7	0		0	
8	1		1	
9	2		4	
10	3		9	
11	4		16	
12	5		25	
13				
14				

2. Plotting several graphs on the same diagram.

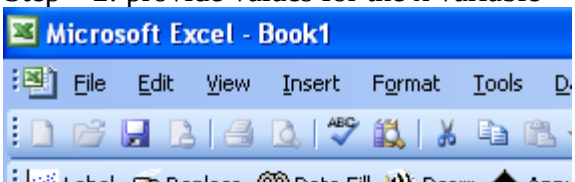
Suppose you want to plot the graphs of the following functions on the same diagram: $f(x) = x^2$ and $g(x) = x^2 + 10$, both defined on the interval [-5,5].

Step – 1: make titles



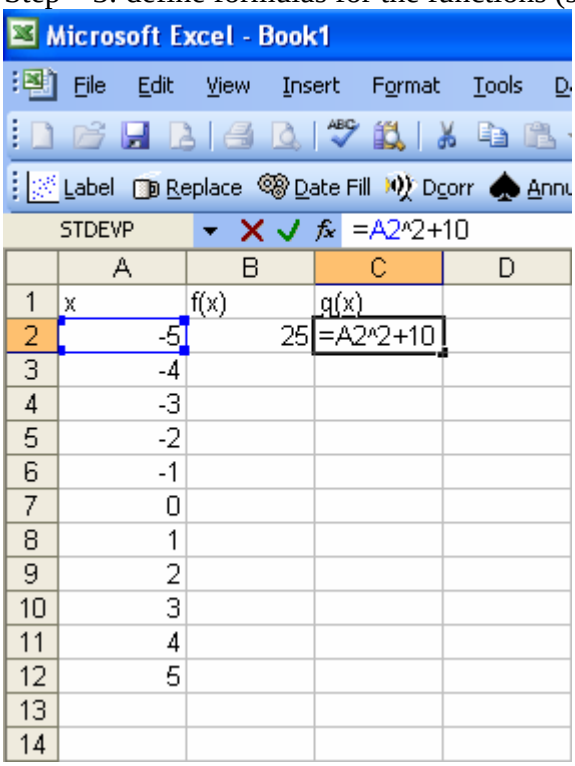
	A	B	C
1	x	f(x)	g(x)
2			
3			

Step – 2: provide values for the x variable



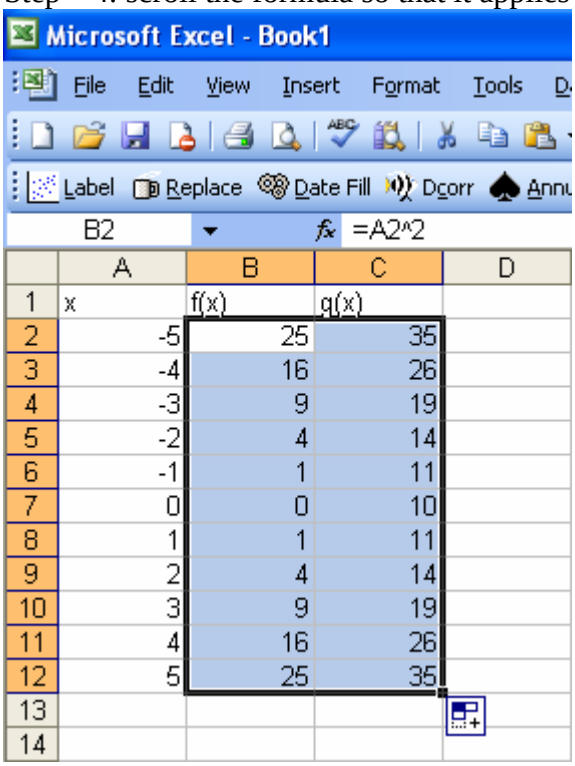
	A	B	C	D
1	x	f(x)	g(x)	
2	-5			
3	-4			
4	-3			
5	-2			
6	-1			
7	0			
8	1			
9	2			
10	3			
11	4			
12	5			
13				
14				

Step – 3: define formulas for the functions (suppose that –5 is in cell A2)



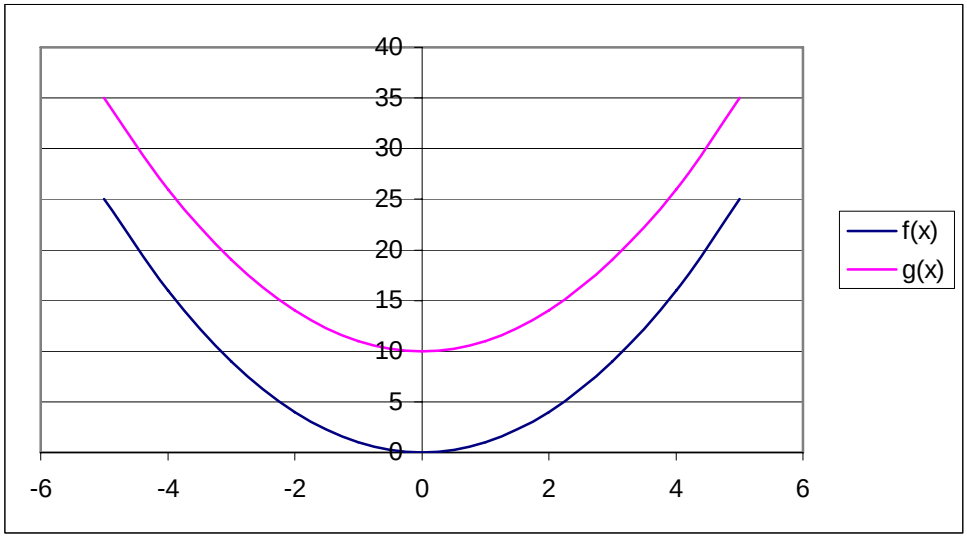
	A	B	C	D
1	x	f(x)	g(x)	
2	-5	25	=A2^2+10	
3	-4			
4	-3			
5	-2			
6	-1			
7	0			
8	1			
9	2			
10	3			
11	4			
12	5			
13				
14				

Step – 4: scroll the formula so that it applies to all values of x.



	A	B	C	D
1	x	f(x)	g(x)	
2	-5	25	35	
3	-4	16	26	
4	-3	9	19	
5	-2	4	14	
6	-1	1	11	
7	0	0	10	
8	1	1	11	
9	2	4	14	
10	3	9	19	
11	4	16	26	
12	5	25	35	
13				
14				

Step – 5: highlight the tree columns, including the titles and choose the Chart wizard. The rest is the same as in the previous part. The result should be:



3. Graphing typed-in data.

Suppose that you have data that you typed in Excel spreadsheet

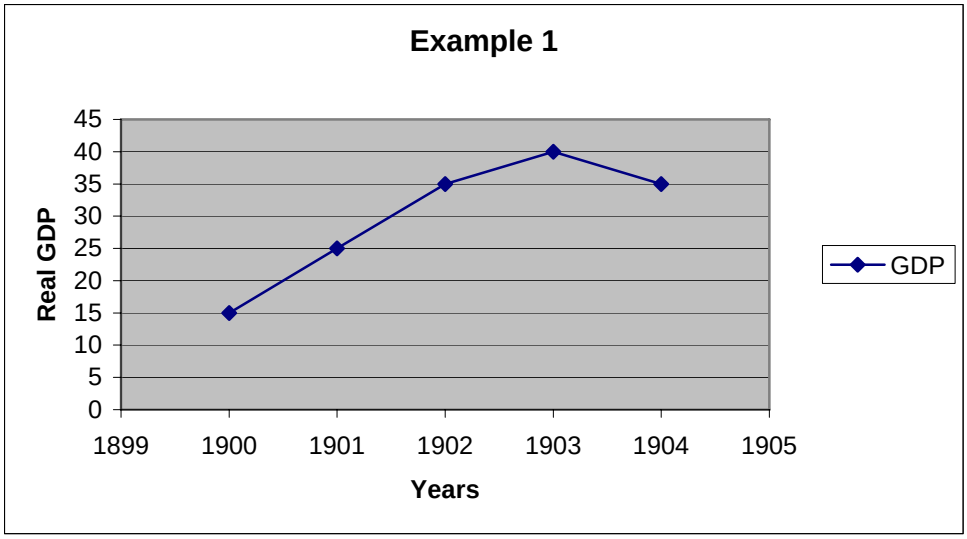
Year	GDP	C	
1900	15	5	
1901	25	22	
1902	35	13	
1903	40	27	
1904	35	33	

First, suppose that you need to plot the graph of GDP against time.
Step – 1: Click with the mouse on the leftmost cell (the one with the title "Year") and highlight the cells containing the two columns "Years" and "GDP" (including the titles). To highlight, start with the leftmost cell with the title "Years" and drag the mouse while pressing the left button, to the last cell, with "35". You should get the following result

Year	GDP	C	
1900	15	5	
1901	25	22	
1902	35	13	
1903	40	27	
1904	35	33	

Step – 2: Click with the mouse on the toolbar icon called "Chart Wizard" (it's the one with the blue, yellow and red columns. Choose the chart type to be "XY (Scatter)". Now you can choose a chart sub-type from the right window. You can choose whether you

want a smooth graph and if you want the data points to be emphasized. For this example I have chosen the non-smooth graph with the data points emphasized. Click "Next".
Step – 3: The next window asks if the data is in rows or columns, when the default is columns, since it's longer. Click "Next". Choose titles for the axis. Click next. Choose the location to be in Sheet1. Click "Finish". The result is

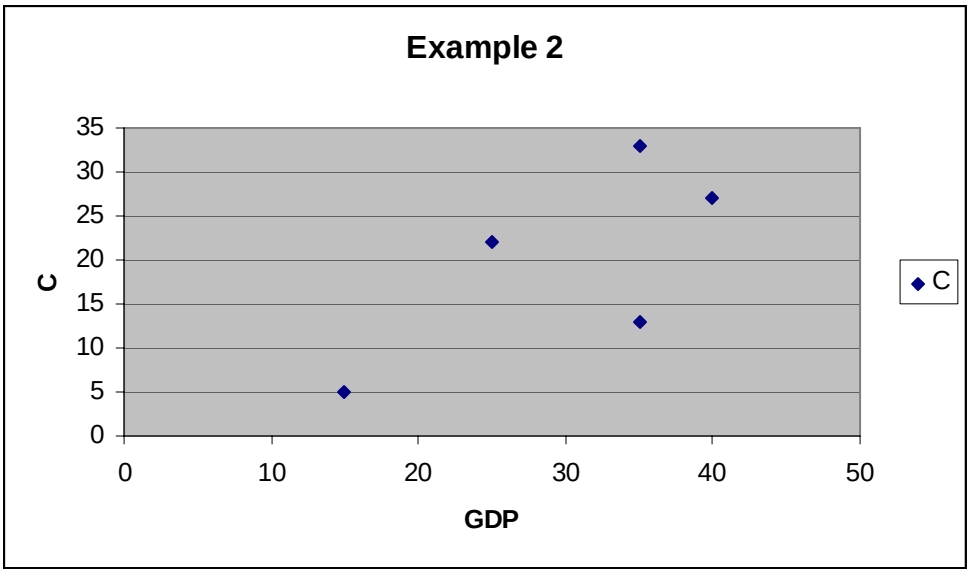


There are many ways to modify this graph, but you'll just have to experiment and see what happens.

Now, suppose you want to make a scatter plot of GDP and consumption.
Step – 1: Highlight the two relevant series like before. The result is

Year	GDP	C	
1900	15	5	
1901	25	22	
1902	35	13	
1903	40	27	
1904	35	33	

Step – 2: Click with the mouse on the toolbar icon called "Chart Wizard" (it's the one with the blue, yellow and red columns. Choose the chart type to be "XY (Scatter)". Now you can choose a chart sub-type from the right window. You can choose whether you want a smooth graph and if you want the data points to be emphasized. For this example I have chosen the non-connected data points.
Step – 3: The next window asks if the data is in rows or columns, when the default is columns, since it's longer. Click "Next". Choose titles for the axis. Click next. Choose the location to be in Sheet1. Click "Finish". The result is



We can add trend-line by clicking on one of the points with the right button of the mouse and choosing “Add Trendline” and then “Linear”. The result is