

# How to use Microsoft Excel: regression analysis Quadratic functions

## Physics 23 Lab

Missouri University of Science and Technology

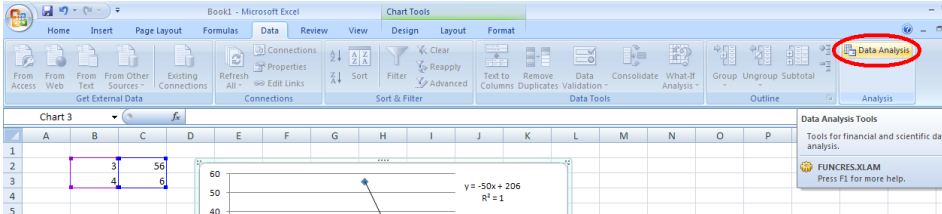
# Data tab

The screenshot shows the Microsoft Excel interface with the 'Data' tab selected in the ribbon. The ribbon includes options for 'Get External Data' (From Access, From Web, From Text, From Other Sources, Existing Connections), 'Connections' (Refresh All, Connections, Properties, Edit Links), and 'Sort' (Sort, Sort & Filter). The spreadsheet area shows a table with data points:

	A	B	C	D	E	F	G	H
1								
2			3	56				
3			4	6				
4								
5								
6								

A scatter plot is visible on the right side of the spreadsheet, showing two data points corresponding to the values in the table. The vertical axis (y-axis) ranges from 20 to 60. The horizontal axis (x-axis) is not explicitly labeled but represents the values in column B (3 and 4). The data points are at (3, 56) and (4, 6). A blue arrow points from the 'Data' tab in the ribbon to the scatter plot.

# Data analysis

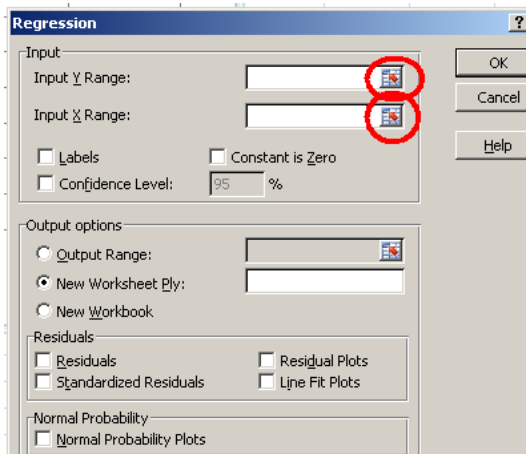


# Regression

The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The 'Data Analysis' dialog box is open, and 'Regression' is highlighted in the list of analysis tools. The 'OK' button in the dialog box is also circled in red. In the background, a chart titled 'Chart 3' is visible, showing a scatter plot of data points from columns B and C. The data points are at (3, 56) and (4, 6).

	A	B	C	D	E	F
1						
2		3	56			
3		4	6			
4						
5						
6						
7						
8						

# Regression $x, y$ : select $x$ input range



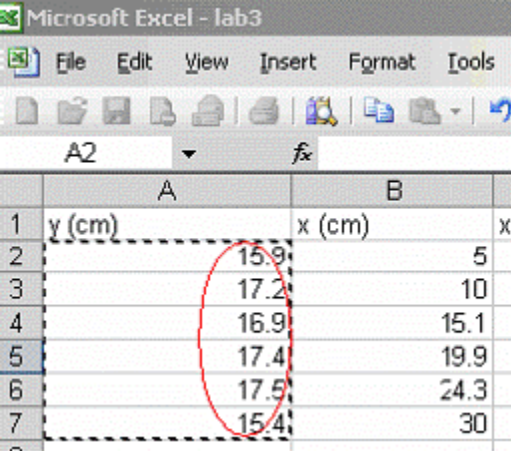
The image shows the 'Regression' dialog box in Microsoft Excel. The 'Input' section contains two text boxes: 'Input Y Range' and 'Input X Range'. Each text box has a small icon to its right, which is used to select a range of cells in the spreadsheet. These two icons are circled in red. Below these text boxes are four checkboxes: 'Labels', 'Confidence Level' (set to 95%), 'Constant is Zero', and 'Normal Probability Plots'. The 'Output options' section has three radio buttons: 'Output Range', 'New Worksheet Ply' (which is selected), and 'New Workbook'. The 'Residuals' section has four checkboxes: 'Residuals', 'Standardized Residuals', 'Residual Plots', and 'Line Fit Plots'. On the right side of the dialog, there are three buttons: 'OK', 'Cancel', and 'Help'.

# Select columns of $x$ and $x^2$

The screenshot shows a Microsoft Excel spreadsheet titled "Microsoft Excel - lab3". The menu bar includes File, Edit, View, Insert, Format, Tools, Data, Window, and Help. The toolbar contains various icons for file operations and calculations. The active cell is B2, and the formula bar shows  $f_x$ . The spreadsheet has three columns: A (y (cm)), B (x (cm)), and C (x^2 (cm^2)). The data is as follows:

	A	B	C
1	y (cm)	x (cm)	x^2 (cm^2)
2	15.9	5	25
3	17.2	10	100
4	16.9	15.1	228.01
5	17.4	19.9	396.01
6	17.5	24.3	590.49
7	15.4	30	900

For “input  $y$  range” select  $y$  column



The screenshot shows a Microsoft Excel window titled "Microsoft Excel - lab3". The menu bar includes File, Edit, View, Insert, Format, and Tools. The toolbar contains various icons for file operations. The active cell is A2, and the formula bar is empty. The spreadsheet data is as follows:

	A	B	
1	y (cm)	x (cm)	x
2	15.9	5	
3	17.2	10	
4	16.9	15.1	
5	17.4	19.9	
6	17.5	24.3	
7	15.4	30	

A red oval highlights the y column (column A) from row 2 to row 7. A dashed black box surrounds the data range from row 2 to row 7 in column A.

# Regression output range

**Regression** [?]

Input

Input Y Range: → \$C\$2:\$C\$3

Input X Range: → \$B\$2:\$B\$3

Labels       Constant is Zero

Confidence Level: 95 %

Output options

Output Range: [ ]

New Worksheet Ply: [ ]

New Workbook

Residuals

Residuals       Residual Plots

Standardized Residuals       Line Fit Plots

Normal Probability

Normal Probability Plots

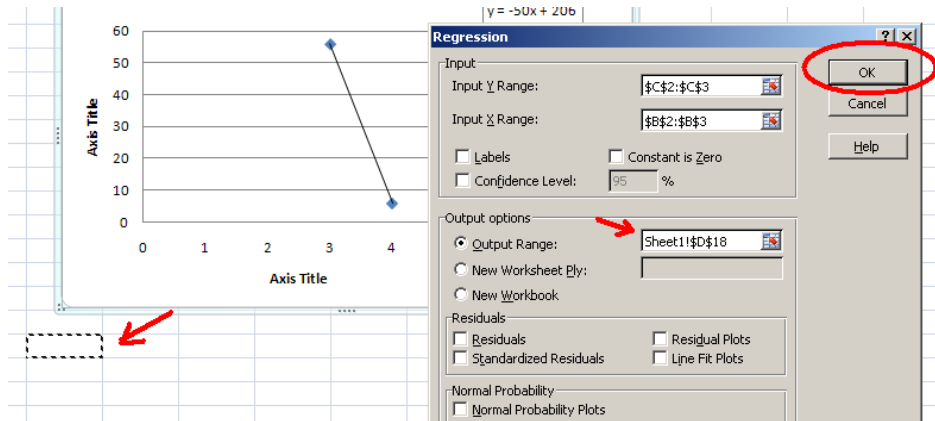
OK

Cancel

Help



# Regression: OK



“Coefficients” column refers to  $y = a_0 + a_1x + a_2x^2$

Values in “Standard Error” are error of  $a_0, a_1, a_2$  respectively

SUMMARY OUTPUT		
<i>Regression Statistics</i>		
Multiple R	0.891157343	
R Square	0.79416141	
Adjusted R Square	0.656935684	
Standard Error	0.507133002	
Observations	6	
<i>ANOVA</i>		
	<i>df</i>	<i>SS</i>
Regression	2	2.976781687
Residual	3	0.771551646
Total	5	3.748333333
	<i>Coefficients</i>	<i>Standard Error</i>
Intercept	14.26479732	0.899497343
X Variable 1	0.379765497	0.117045486
X Variable 2	-0.011117756	0.003282403