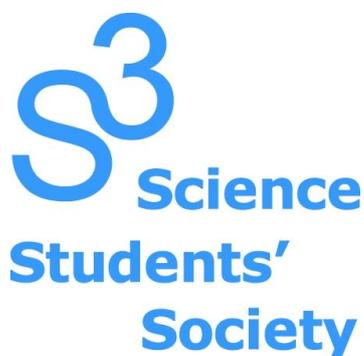


Basic Linear Regression tutorial using GraphPad Prism



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Introduction

GraphPad Prism, available for both Windows and Mac computers, combines scientific graphing, comprehensive curve fitting (nonlinear regression), understandable statistics, and data organization.

GraphPad Prism was originally designed for experimental biologists in medical schools and drug companies, especially those in pharmacology and physiology. Prism is now used much more broadly by all kinds of biologists, as well as social and physical scientists. More than 200,000 scientists in over 110 countries rely on Prism to analyze, graph and present their scientific data. It is also widely used by undergraduate and graduate students.

1. Downloading GraphPad Prism

This software is shareware and a fully functional 30-day trial can be downloaded from <http://www.graphpad.com/demos/>

2. Constructing a Linear regression

1. Open Prism and the welcome screen will appear.

2. Select **XY** from **New Table & Graph** Menu

3. Select your preferred way to input Y-values from **Enter/import data list**

4. Select **linear regression – compare slopes** from the **Use sample data list**

5. Input the title and the values for the independent (x) variable

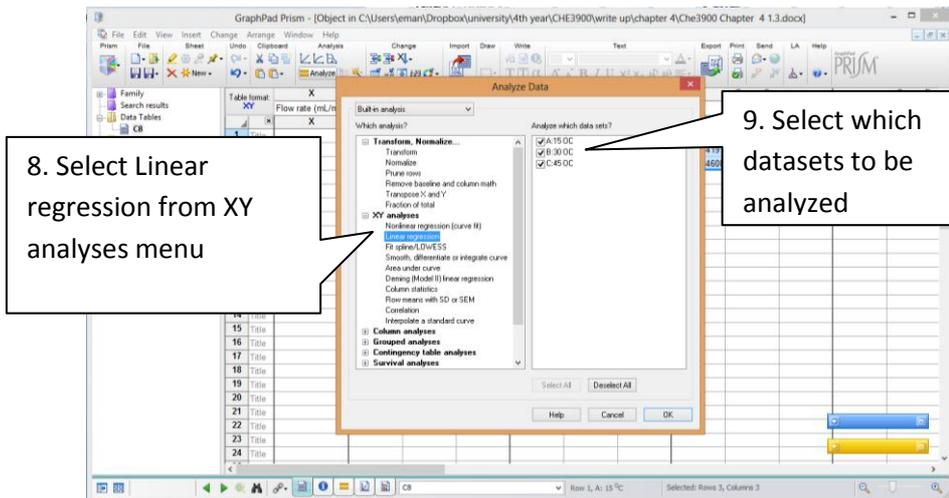
7. To perform the linear regression click on **Analyze**

6. Input the title and the values for the dependent (Y) variable

Note: More than one dataset can be inputted which would result in more than one linear regression on the same plot

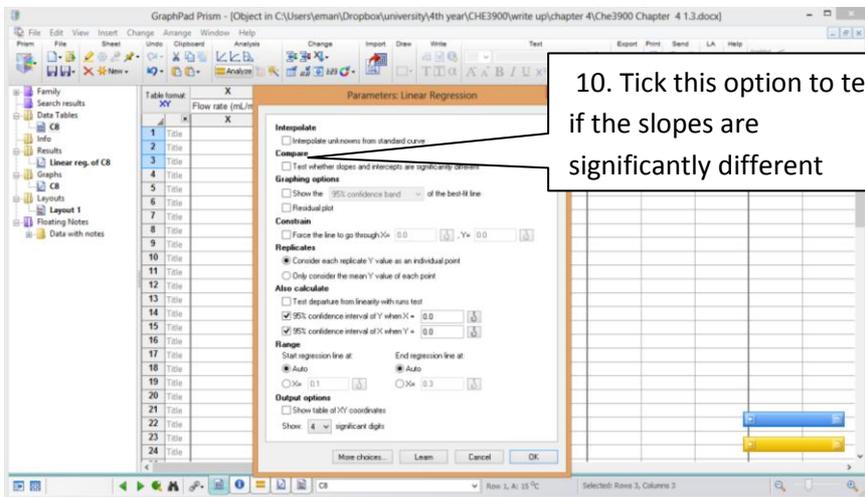
The screenshot shows the GraphPad Prism software interface. The 'New Table & Graph' dialog box is open, showing the 'XY' table type selected. The 'Enter/import data list' section has 'Enter and plot a single Y value for each point' selected. The 'Use sample data list' section has 'Linear regression - Compare slopes' selected. Below the dialog box, a data table is visible with columns for 'X' and 'Y' values for two groups, Group A and Group B. The table has 10 rows, with the first row containing titles and the subsequent rows containing numerical data.

	X	Group A 15 °C	Group B 30 °C
1	Title	A:Y1	A:Y3 B:Y1 B:Y3
2	0.1	7.27560	6.319 7.26772 5.90696 5.774 5.75060
3	0.2	6.44121	9.113 6.70944 6.41248 5.310 5.29060
4	0.3	6.12701	9.657 6.27527 4.72205 4.8240
5	Title		
6	Title		
7	Title		
8	Title		
9	Title		
10	Title		



8. Select Linear regression from XY analyses menu

9. Select which datasets to be analyzed



10. Tick this option to test if the slopes are significantly different

11. Click on Results to report the required linear regression parameters

	1	2	3
1 Best-fit values			
2 Slope	-5.329 ± 0.4768	-5.226 ± 0.3137	-3.688 ± 0
3 Y-intercept when X=0.0	7.250 ± 0.1030	6.339 ± 0.06776	4.868 ± 0
4 X-intercept when Y=0.0	1.454	1.213	1.321
5 1/slope	-0.1876	-0.1914	-0.2713
6 95% Confidence Intervals			
7 Slope	-6.457 to -4.202	-5.968 to -4.484	-4.215 to
8 Y-intercept when X=0.0	7.506 to 7.994	6.179 to 6.500	4.754 to 4
9 X-intercept when Y=0.0	1.235 to 1.791	1.087 to 1.381	1.180 to 1
10 Goodness of Fit			
11 R square	0.9470	0.9754	0.9748
12 Sy.x	0.1168	0.07683	0.05485
13 Is slope significantly non-zero?			
14 F	125.0	277.6	271.0
15 DFn, DFd	1,000, 7,000	1,000, 7,000	1,000, 7,0
16 P value	< 0.0001	< 0.0001	< 0.0001
17 Deviation from zero?	Significant	Significant	Significant
18 Data			
19 Number of X values	3	3	3
20 Maximum number of Y replicates	3	3	3
21 Total number of values	9	9	9
22 Number of missing values	0	0	0
23 Equation	Y = -5.329X + 7.250	Y = -5.226X + 6.339	Y = -3.688X + 4.868

12. Click on Graphs to go to the plot

Note: Usually the following are reported:

- Slope (+/-)
- Intercept (+/-)
- Regression coefficient (R-square)
- Sy.x (Standard Error of the Estimate)
- P-value (the p-value for determining the slope if it is significantly non-zero). A p-value below 0.05 means that the difference is statistically significant.

13. Choose **XY** from **Graph Family**

14. Choose **Points with error Bars (if an average is used)**

15. Select **Mean and Error** from **Plot** drop-down menu

16. Select **SD (Standard Deviation)**

17. Click **OK** when done

18. To modify or format the graph, double click the area you like to change

19. The graph can be exported as image or editable object in MS Word or MS PowerPoint using either copy|paste function or the export/send options