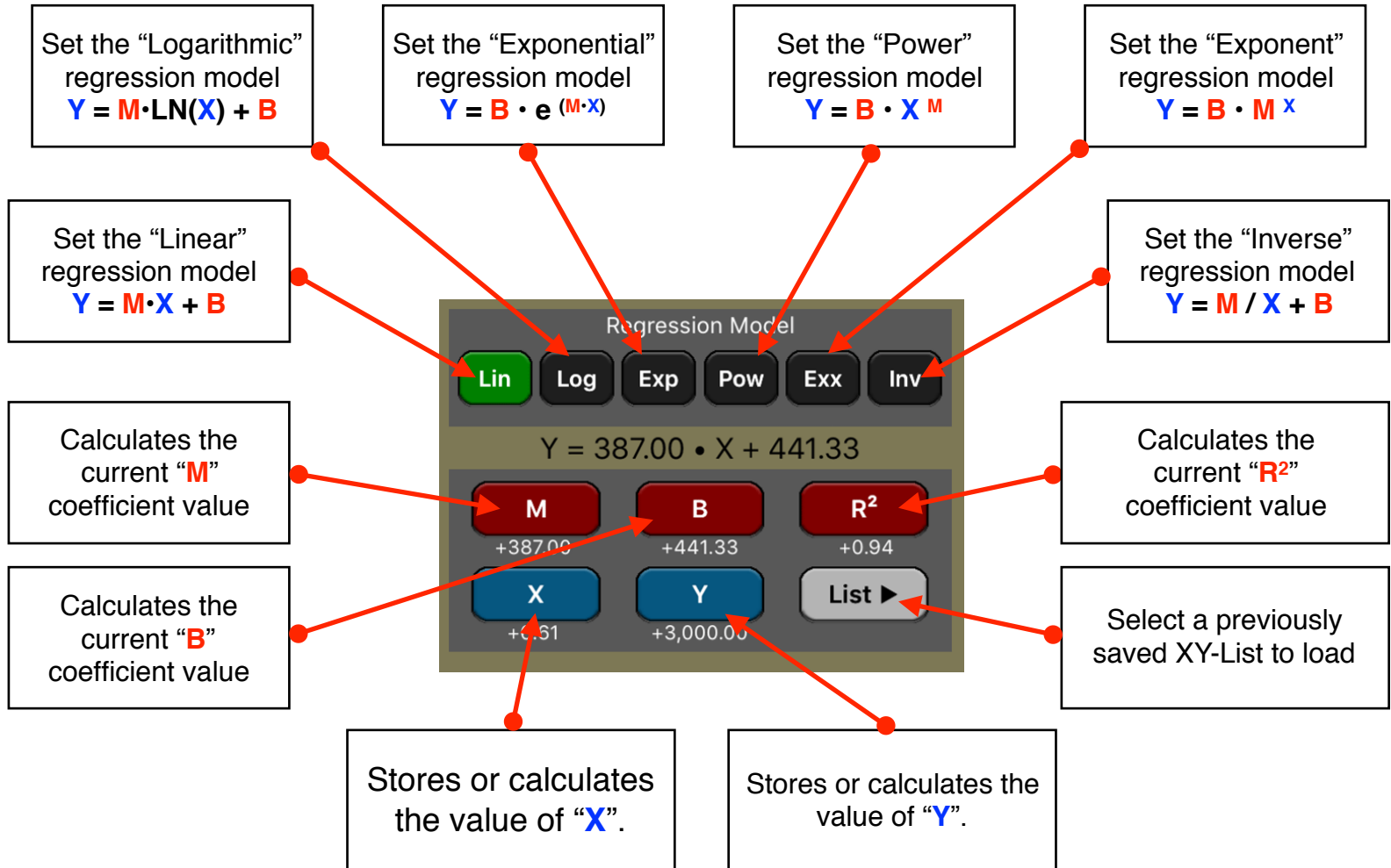


# Regression Model “Pro” Tool

This tool is an expansion of the statistics calculation capability included in the original HP-12C calculator. To show it, touch the **OPT** and touch the “Statistics” menu button. Then select the “Regression Model” option.



To properly use the “Regression Model” tool you previously have to create a XY-List file with the samples of X,Y values under analysis. Look the “X,Y Data Editor” topic for more information about this.

**Example:** For the last six weeks the following data was collected: minutes of advertising purchased in local radio and the corresponding total sales

Week	Minutes (X)	Sales (Y)
1	2	\$1,400
2	1	\$920
3	3	\$1,100
4	5	\$2,265
5	6	\$2,890
6	4	\$2,200

What is the best regression model and equation that best fits the data?;  
 What is the estimated sales for a 8 minutes of advertising in the best model?;  
 How many minutes of advertising are estimated to obtain \$3,000.0 sales?.

**Solution :**

First enter the data in the form “Minutes” as X-values and “Sales” as Y-values:

Keys	Comment
<b>[f] clear [Σ]</b>	Clears statistics registers and current statistic data list.
<b>[OPT]</b>	Shows the calculator’s options selection menu.
<b>[Statistics] [X,Y Data Editor]</b>	Shows “X,Y Data Editor” tool to enter the samples.
<b>[ADD]</b>	Creates a new data sample.
2 <b>[INPUT]</b> 1400 <b>[INPUT]</b> <b>[ADD]</b>	Entries the first sample and adds a new one.
1 <b>[INPUT]</b> 920 <b>[INPUT]</b> <b>[ADD]</b>	Entries the second sample and adds a new one.
3 <b>[INPUT]</b> 1100 <b>[INPUT]</b> <b>[ADD]</b>	Entries the third sample and adds a new one.
5 <b>[INPUT]</b> 2265 <b>[INPUT]</b> <b>[ADD]</b>	Entries the fourth sample and adds a new one.
6 <b>[INPUT]</b> 2890 <b>[INPUT]</b> <b>[ADD]</b>	Entries the fifth sample and adds a new one.
4 <b>[INPUT]</b> 2200 <b>[INPUT]</b> <b>[ADD]</b>	Entries the sixth sample and adds a new one.
<b>[Action ►] [Save To File]</b>	Name the list as “Test1” and Save.
<b>[Done]</b>	Updates the statistic registers and closes the view.

Now, in the “Regression Model” tool do the following:

Keystrokes	Description
[List ►]	Select the just created “Test1” list
[Lin] [R <sup>2</sup> ]	Select the Linear model and calculate R <sup>2</sup> . <b>Result = 0.9365</b>
[Log] [R <sup>2</sup> ]	Select the Logarithmic model and calculate R <sup>2</sup> . <b>Result = 0.8733</b>
[Exp] [R <sup>2</sup> ]	Select the Exponential model and calculate R <sup>2</sup> . <b>Result = 0.9257</b>
[Pow] [R <sup>2</sup> ]	Select the Power model and calculate R <sup>2</sup> . <b>Result = 0.8921</b>
[Exx] [R <sup>2</sup> ]	Select the Exponent model and calculate R <sup>2</sup> . <b>Result = 0.9257</b>
[Inv] [R <sup>2</sup> ]	Select the Inverse model and calculate R <sup>2</sup> . <b>Result = -0.7665</b>

The best regression model is “**Linear**” because it has the correlation coefficient (R<sup>2</sup>) closest to 1.

The equation is:

Keystrokes	Description
[Lin]	Select the Linear model.
[M]	Linear regression slope. <b>Result = 387.00</b>
[B]	Linear regression Y-intercept. <b>Result = 441.33</b>
<b>Equation: <math>Y = 387 \cdot X + 441.33</math></b>	

Now, calculate the estimated values for “Minutes” and “Sales”:

Keystrokes	Description
Type “8” [X]	Enters the X-value for Minutes.
[Y]	Calculates the estimated Sales. <b>Result = \$3,537.33</b>
Type “3000” [Y]	Enters the X-value for Sales.
[X]	Calculates the estimated Minutes. <b>Result = 6.61</b> (minutes)