

# Curve fitting – linear - log.

This resource was written by Derek Smith with the support of CASIO New Zealand. It may be freely distributed but remains the intellectual property of the author and CASIO.

Select STAT mode from the main menu by using the arrow keys to highlight the STAT icon or pressing 2.



$y = ab^x$   
 transforms to  $\log y = \log(ab^x)$   
 $\log y = \log(a) + \log(b^x)$   
 $\log y = \log(a) + x \log(b)$   
 so an  $x - y$  axis set transforms to an  $x - \log y$  set and hence curves become straight lines.

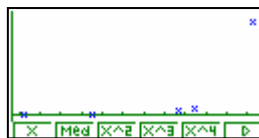
**Example:** The following data was recorded and needs to be analysed to find the equation that governs the relationship between L and W.

X	1.2	4.5	8.7	9.5	12.3
Y	13.28	360.06	24011	53438	878783

**Answer:** Enter the data into List 1 (X values) and List 2 (corresponding Y values).



Draw a scattergraph using List 1 (as X) and List 2 (as Y).



This scattergraph illustrates that a linear-log transformation could be used.

In list 3 place in the corresponding log Y. [See worksheet on Lists.]

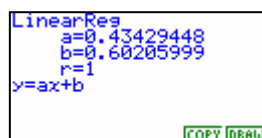


Draw a scattergraph using List 1 (as X) and List 3 (as log Y).



As can be seen the co-ordinates ( X, log Y) have been straightened.

Press F1 for the regression analysis



Using the transformation  $y = ab^x$   $\log a = 0.60205999$  and  $\log a = 0.43429448$  giving  $a = 3.99999988$  and  $b = 2.718281817$

The equation that generated these values was  $y = 4e^x$