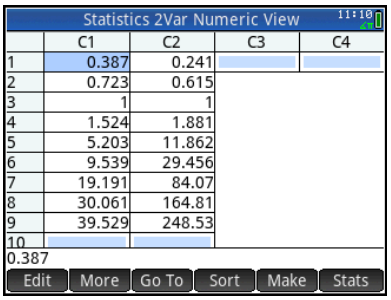
TECHNOLOGY CORNER for Section 12.2, Page 781

30. Transforming to achieve linearity on the HP Prime

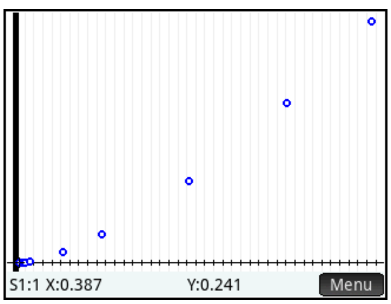
We'll use the planet data to illustrate a general strategy for performing transformations on the HP Prime. Although we will focus on transformations involving natural logarithms, the same approach can be used for roots, powers, or any other type of transformation of the data.

1. Press [Apps Info] and tap the *Statistics 2Var* app icon. Enter the distance from sun data in C1 and the period of revolution data in C2. This data is found on page 779.

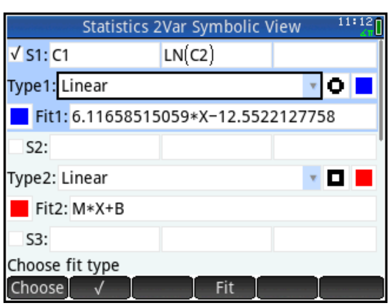


	C1	C2	C3	C4
1	0.387	0.241		
2	0.723	0.615		
3	1	1		
4	1.524	1.881		
5	5.203	11.862		
6	9.539	29.456		
7	19.191	84.07		
8	30.061	164.81		
9	39.529	248.53		
10				

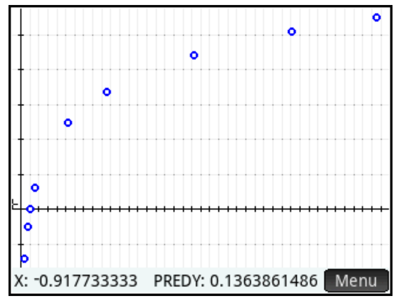
2. Make a scatterplot of *y* versus *x*. Press [View Copy] and select *Autoscale* to see the scatterplot and confirm there is a curved pattern.



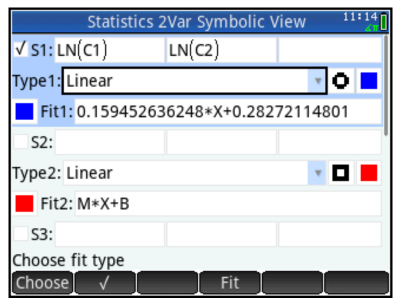
3. To see whether an exponential model fits the original data, define S1 to use C1 and LN(C2) in the *symbolic view*.

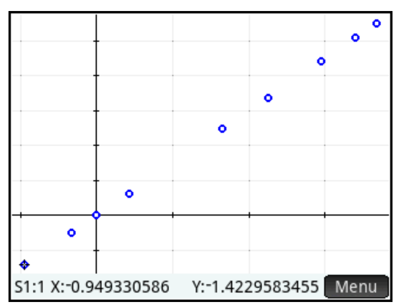


4. Again, use the Autoscale option and look for linearity.



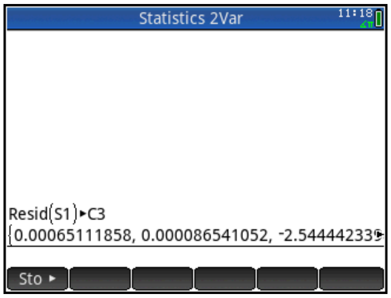
5. To see whether a power model fits the original data, define S1 to use LN(C1) and LN(C2) and look for linearity.



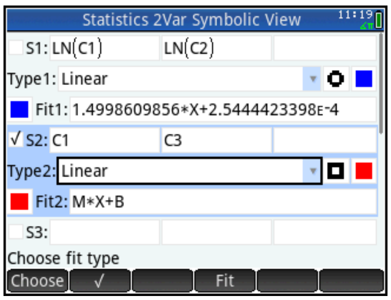


6. If a linear pattern is present, calculate the equation of the least-squares regression line. Tap [Menu] and [Fit•].
7. Construct a residual plot to look for any departures from the linear pattern.

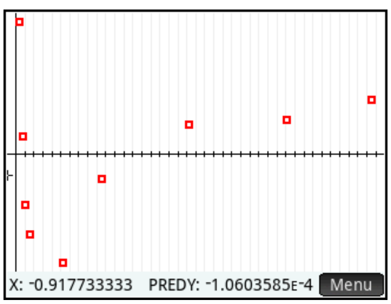
8. Press to go to the Home view and store RESID(S1) in C3.



- Press to enter the Symbolic view. Uncheck S1 and define S2 to use C1 and C3.

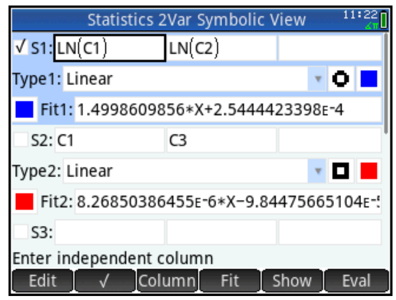


- Again, use the Autoscale option.

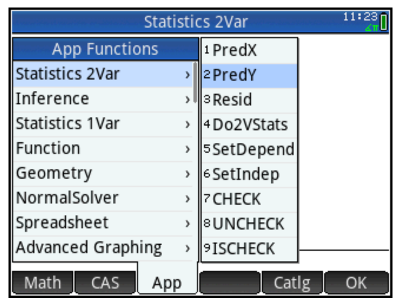


To make a prediction for a specific value of the explanatory variable, compute log *x* or ln *x*, if appropriate. Then use PredY(k) to obtain the predicted value of log *y* or ln *y*. To get the predicted value of *y*, use 10^Ans or *e*^Ans to undo the logarithmic transformation. Here's our prediction of the period of revolution for Eris, which is at a distance of 102.15 AU from the sun:

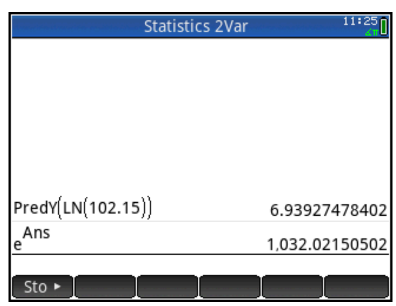
- Press to go to Symbolic view. Uncheck S2 and check S1 (S2 has a fit that we do not want to use!)



- From Home view, press , tap App, tap *Statistic 2Var*, and select *PredY*



- Complete the command PredY(LN(102.15)). Then enter e^Ans to find the period of revolution of Eris.



Note: Press Shift LN for e^ and Shift + for Ans