

## Logarithmic or Exponential? Aggrandising Rates of Change

- Recognise and describe graphs in form of  $n \cdot a^x$
- Recognise graphs in  $\log_x$
- Use mathematical models to solve problems of exponential growth
- Exponents
- Logarithms

You are a mathematical researcher in search of finding a corresponding trend to fit data you modeled from an electronics store. From the data you collected in the table of values, you are going to have to try and determine whether a trend would best fit a logarithmic or exponential trend.

Justify based on your knowledge and understanding of aggrandizing rates of change, whether a logarithmic trend ( $a + b \ln x$ ) would suit the data in table 1 or whether an exponential trend ( $a \cdot b^x$ ) would be more suitable (by more suitable I mean less correlation). Use relevant examples from the table to justify your model choice and use shape to describe the concept of what a plotted trend may look like.

Screen Size of TV (")	Cost in \$
32	699
38	899
42	1049
50	1149
52	1229
60	1349

Describe, how using a Ti84, one could calculate and interpret the correlation of this data from a particular model. Calculate the correlation of the above figures from the exponential trend regression and logarithmic trend regression.

Give a few examples as to how logarithmic trends are different from exponential trends

Calculate a trend based on the dotpoints (0,400), (2, 25). Is this trend likely to be exponential or logarithmic? Why?

What if we added in the dotpoints (5, 24) and (7,23.5)? Does the model for describing the data change? Is this more likely to be some other model? Check for correlation on your calculator and justify your response.

Graph a plot of  $2 \cdot 3^x$  and calculate what  $y$  shall be when  $x = 10000$

Calculate in rough terms what  $x$  shall be when  $y = 200$  and show the algebraic processes involved

Use log laws to solve for x in the exponential equation  $y = 5 \cdot b^a$ , when b is expressed as being  $2^{3-b} = 5^b$ . Round to four significant figures and then attempt to sketch a rough trend based on input into your Ti 84 graphics calculator

Solve the following using the laws of logarithms

$$\log_2 5$$

$$2 - \log 5$$

$$\log 63 - \log 2 + \log 6 + \log 3$$

$$\log_{x+1} 125 = 3$$

Prove algebraically that  $\text{Log}_7 49$  is equal to  $1/\log_{49} 7$