Lab report

Objectives

{ Summarize the lab's objective(s) as you understand them. For example: }*

The primary objective of this lab is to explore the properties of exponential functions, and to compare them with the properties of other functions such as linears and powers of x. We will do this by working through the 3 specific tasks assigned here.

Task I

{ State what the task is about. Here is an example showing one way to do that: }*

In this exploration we are given 4 different tables of x-y values, representing either linear or exponential functions. The goal is to tell without graphing which table represents which type of function. Once we figure out which type of function it is, we also want to find an algebraic form of the function.

{ Show what you did. Here is an example showing one way to do that:}*

By looking for patterns in the y-values, we noticed that a linear function has a very distinct pattern: The y-value changes by a constant amount for a constant increase in the x-value. This pattern is seen in tables 2 and 3

x	y		x	y
21.5	4.32		- 12	1.1
32.6	4.203		- 8	2.14
43.7	4.086		- 4	3.18
54.8	3.969		0	4.22

In table 2, for each 11.1 unit increase in x, the y-value changes by -0.117.
Similarly, in table 3, ...

{ Complete the story, including discussing what pattern you noticed for exponentials. }*

To find algebraic forms of each function, we simply plugged in pairs of x-y values into the general form of the equation and solved for the unknown parameters. For example, table 1 represents an exponential, whose general form is

$$y = ca^x$$

Plugging in values from the 1st two rows in table 1 we get

$$5 = ca^5$$
$$10 = ca^6$$

which can be solved: $10/5 = (ca^6)/(ca^5) \;\Rightarrow\; 2 = a$.
Next, we use the solved value of a to find c: $5 = c \cdot 2^5 \;\Rightarrow\; c = 5/(2^5) = 5/32$.
Thus the algebraic form of the function in table 1 is: $\boxed{y = (5/32) \cdot 2^x}$

Similarly, for table 2 we get: .....
for table 3: .....
and table 4: .....

{ Conclude with any summary or highlights of the exploration results. For example: }*

To summarize, we learned that linear functions change by an additive constant when the x-values increase by a constant. On the other hand, exponential functions change by a multiplicative constant when the x-values increase by a constant.

Task II

{ State what the task is about}*

In this exploration we ....