**Activity 5.1.3 Exploring Log Functions**

**Directions:** Navigate to: <https://tube.geogebra.org/m/84042> and manipulate the sliders for *a*, *b*, *h* and *k* to get an idea of how changing the parameters impact the function.

1. Given that the standard form of the equation for a logarithmic function is:

, identify which variable represents the following translations:

1. translates the function up and down: b) vertically stretches the function:

c) horizontally stretches the function: d) translates the function left and right:

1. Put the function back into standard form by resetting *a* = 1, *b* = 1, *h* = 0, and *k* = 0. Now, slide *a* up and down. Describe the changes to the log function. Pay particular attention to and write about: the domain, the end behavior, increasing or decreasing, and the asymptotes.

1. Put the function back into standard form and move the slider for *b* up and down. Describe the impact on the function of multiplying *x* by a constant. Pay particular attention to and write about: the domain, the end behavior, increasing or decreasing, and the asymptotes.
2. Put the function back into standard form and move the slider for *h* up and down. Describe the changes made to the log function. Pay particular attention to and write about: the domain, the end behavior and the asymptotes.
3. Put the function back into standard form and move the slider for *k* up and down. Describe the changes to the function when you add a constant to the function. Pay particular attention to and write about: the domain, the end behavior, increasing or decreasing, and the asymptotes.
4. Sketch the following functions and describe the transformations. Additionally include in your description information about: the domain, range, asymptotes,increasing or decreasing**,** and end behavior.



2. 
3. 
4. Describe any similarities or differences between the translations you’ve just examined with the logarithmic functions to the functions you’ve previously studied.
5. The log function has a unique parameter to its family, its base. You just studied the family with base 10. What difference would there be between the graph of f(x) = log x and g(x) = log2 x? How about r(x) = log20 x? Make a table of values and then sketch the graphs on one set of axes below.