**Activity 5.1.2 Using the Definition of a Logarithm**

1. Using the definition

if and only if

rewrite the following exponential equations as logarithmic equations.

1. Using the relationship

if and only if

rewrite the following logarithmic equations into exponential equations.

1. Determine by rewriting the logarithmic equation as an exponential equation.
2. (a)Find y: y = log 90. First estimate the answer your calculator should give you. At the very least you should be able to capture it between 2 consecutive whole numbers. What are those whole numbers? Remember base 10 is the common base so we do not have to write it. (b)There is an index with roots we do not have to write explicitly. What is it?
3. Returning to the folding paper in class. How many folds will produce 512 rectangles?
4. In 2e above could also have been written as

Look at a few more problems

|  |  |
| --- | --- |
| log 10000 = log 104 = |  |
| log 1000 = log 103 = |  |
| log 100 = log 102 = |  |
| log 10 = log 101 = |  |
| log 1 = log 100 = |  |
| log 0.1= log 10-1 = |  |
| log 0.01 = log 10 -2 = |  |

1. Do you see a pattern developing? What is it?
2. Will the same pattern work for log2 8 = log2 23 = ?

Since the logarithm base b function is the inverse of the exponential function with base b, the logarithm undoes the exponential function . It should seem reasonable that the log 10a = a for any value of a. Did you see this pattern in part a? \_\_\_\_We will return to this pattern and investigate another related pattern in a later activity.