Finding an Exponential Function from a Data Table

Definitions:

An **Exponential Function** is a relationship of numbers in which a positive base is raised to powers other than one.

Formulas:

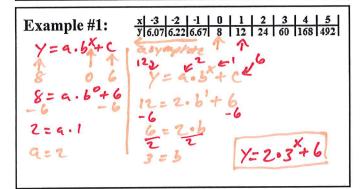
a is an initial value or coefficient.

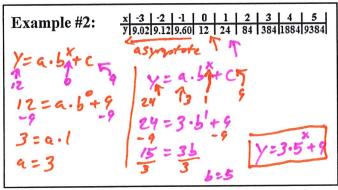
 $y = ab^x + c$ or

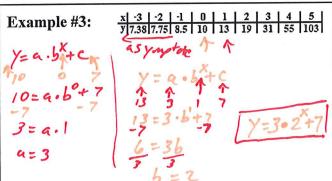
b is the base being raised.

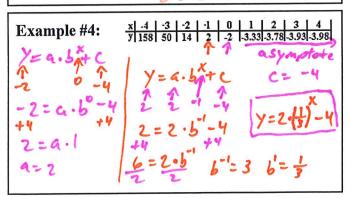
 $f(x) = ab^x + c$

c is the horizontal asymptote.









My first job, when looking for the formula in the table, was to determine the horizontal asymptote. Since I saw that the y-values were moving closer and closer to six, I am calling my asymptote '6.' There are no decimal asymptotes in this class.

In example two, I identified my asymptote at '9' because of the values I saw on the table and then I picked out the best two points to use in two copies of the formula. The first and best value is whatever comes with the x-value of zero. This is useful because the b^x will always equal '1' when x is zero. We know that all numbers to the zero are one.

The next-best point to choose after the x=0 is, if I can get it, the x=1 value. The second point gives us the clue we need to unlock not just the a-value but also the b-value. Anytime I can, I want to use adjacent points (values from x's right next to each other). Usually the x=0 and x=1 are the two best to use.

My table is very different this time because my asymptote is on the right-side and is negative, getting closer and closer to '-4.' In the event that I do not have good wholenumber x=0 and x=1 values, I might use an x=-1 instead. I can will have to do this using a reciprocal at the end of my calculations to turn the b^{-1} into a b^{-1} .