Graphing Exponential Functions

Graphing exponential functions are not very hard - there are just a few steps you need to follow!

1) Plug in -2, -1, 0, 1, and 2 into the function to generate ordered pairs that you can use to sketch the function.

2) Sketch the curve, noting the y-intercept and direction.

3) Extend the curve on both sides, knowing that one side will approach a horizontal asymptote (becomes horizontal and approaches but does not touch a certain y-value) and the other side will approach either positive or negative infinity.

Let's practice a couple of examples!

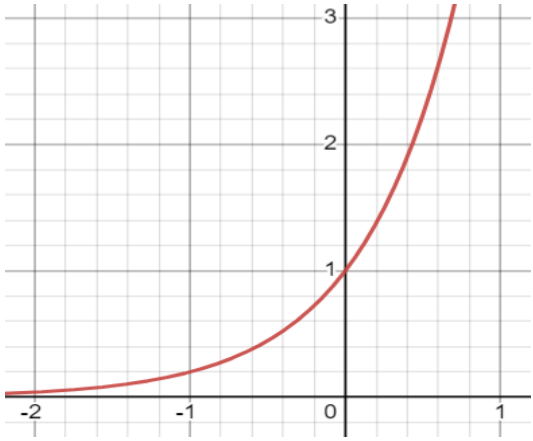
$$y = 5^x$$

Make a table to get points to plot!

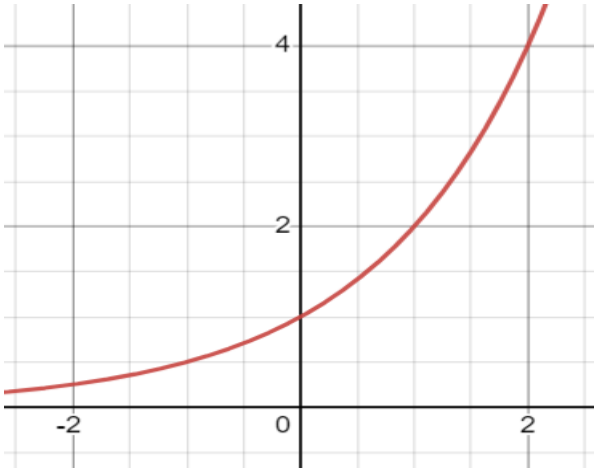
x	**y**
-2	$\frac{1}{25}$
-1	$\frac{1}{5}$
0	1
1	5
2	25

From the table of points, we can figure out that the right side (more POSITIVE values of x) is going towards POSITIVE infinity and the left side is going to approach, but not TOUCH 0. The y-intercept is also (0, 1).

Graphing the point as a curve, we get:



What if we get a graph and need to identify the exponential function?



The key is to find points on the graph that will tell us what it is. For instance, this graph goes through (0, 1), (1, 2) and (2, 4) - each y-coordinate doubles when the x-coordinate increases by 1, so the function is $y = 2^x$.

Tips for Solving Problems:

1. The points you plot are going to be super important to help you graph your function! They help you identify the direction of your function and they tell you what side of the function is going to positive or negative infinity and what side is approaching a horizontal asymptote.

2. If you have a y-intercept that is not 1, you need to put it on the outside of the function. For instance, if you have a y-intercept of 2 for the function 2^x, your equation would be $2\ (2^x)$.

3. If the exponential function's base is greater than 1, the function goes from 0 to positive infinity. If the exponential function's base is between $0 < x < 1$, the function goes from positive infinity to 0. This leads to the idea of exponential growth and decay, so make sure to check out that lesson if you have not already!