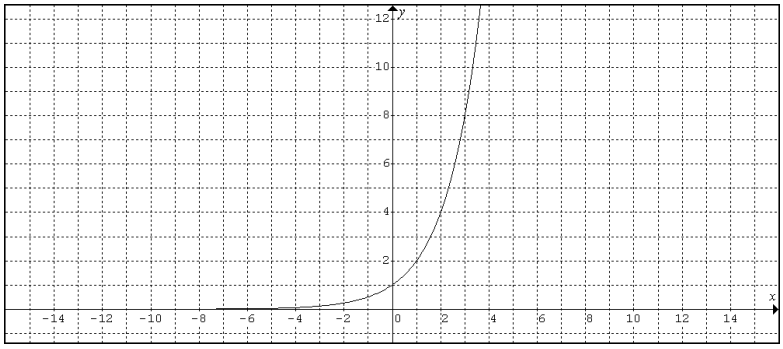
Graphing Exponential Relationships

Example 1: Using a table of values, graph the function $y = 2^x$.

x	y
-3	$\frac{1}{8} = 0.125$
-2	$\frac{1}{4} = 0.25$
-1	$\frac{1}{2} = 0.5$
0	1
1	2
2	4
3	8



Small-group activity – graphing various basic functions.

$y = 3^x$ $y = 4^x$ $y = 5^x$ $y = 6^x$ $y = 1^x$

$y = \left(\frac{1}{2}\right)^x$ $y = \left(\frac{1}{3}\right)^x$ $y = \left(\frac{1}{4}\right)^x$ $y = \left(\frac{1}{5}\right)^x$ $y = (-2)^x$

Summary

The basic exponential function is $y = b^x$.
If $b > 1$, then y increases from left to right.
If $0 < b < 1$, then y decreases from left to right.
The y-intercept is 1.
There is a horizontal asymptote of $x = 0$.

Practice: Graph the following functions. Note similarities and differences to the basic exponential function.

$y = 3(2)^x$ $y = -(2)^x$ $y = 4(2)^x$ $y = -0.4(2)^x$