

**11/5 Warm Up****Lesson 4-1: Exponential Functions****Objective**

Students will...

- Be able to define what an exponential function is.
- Be able to evaluate an exponential function at any given value using a calculator.
- Be able to know how to graph an exponential function by hand by making a table of values.

**Exponential Functions**

In our previous chapter, we studied polynomial and rational functions. Yet another important and practical function group is the exponential function.

The \_\_\_\_\_ **function** with \_\_\_\_\_  $a$  is defined for all real numbers by  
 $f(x) =$  \_\_\_\_\_, where \_\_\_\_\_ and \_\_\_\_\_

We assume  $a \neq 1$  because the function  $f(x) = 1^x = 1$  for any  $x$ , which makes it just a constant function.

Also, note that here our **exponent** is the \_\_\_\_\_, instead of the **base**.

**Evaluating Exponential Functions**

Evaluating exponential functions follows the same logic as evaluating any kind of a function. You simply “ \_\_\_\_\_ ” whatever number it is that you are trying to evaluate at for the variable  $x$ . Now, especially with exponential functions, calculators would seriously come in handy. Note that most calculators use the symbol, “^” for exponents.

Ex. Let  $f(x) = 3^x$ . Evaluate the following. Use a calculator if needed.

a.  $f(2)$

b.  $f\left(-\frac{2}{3}\right)$

c.  $f(\pi)$

d.  $f(\sqrt{2})$

**Graphing Exponential Functions**

As always, the most basic way to graph any function is by making and using the “ $x, y$ ” table. Let’s graph the following functions. Again, it’d be wise to use a calculator here.

$f(x) = 3^x$

$f(x) = \left(\frac{1}{3}\right)^x$