

# Study Guide

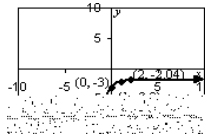
Exponential Functions  
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## **Exponential Functions**

An exponential function is an equation that has a variable in the exponent. The functions below are all

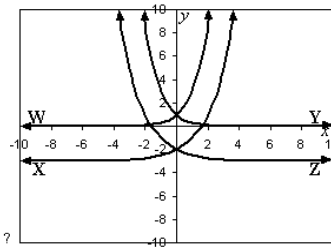
$x$	$y = -2 - 5^x$	$(x, y)$
-2	-27	$(-2, -27)$
-1	-7	$(-1, -7)$
0	-2	$(0, -2)$
1	-3	$(1, -3)$
2	-5	$(2, -5)$

**Step 5:** Plot the points on a coordinate plane to graph the exponential function.



**Step 6:** Compare this graph to the solution choices and choose the correct answer, which is choice D.

**Answer: D.**



**Example 2:** Which graph represents the exponential function  $y = 3^x$ ?

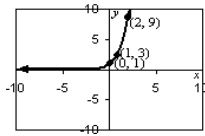
**Step 1:** Make a table of values and choose  $x$ -values to substitute into the equation.

$x$	$y = 3^x$	$(x, y)$
-2	$1/9 = 0.\bar{1}$	$(-2, 0.1)$
-1	$1/3 = 0.\bar{3}$	$(-1, 0.3)$
0	1	$(0, 1)$
1	3	$(1, 3)$
2	9	$(2, 9)$

**Step 2:** Substitute the values in the  $x$  column into the equation in the center column to determine the corresponding  $y$ -values. Write the coordinate points in the  $(x, y)$  column.

$x$	$y = 3^x$	$(x, y)$
-2	$1/9 = 0.\bar{1}$	$(-2, 0.1)$
-1	$1/3 = 0.\bar{3}$	$(-1, 0.3)$
0	1	$(0, 1)$
1	3	$(1, 3)$
2	9	$(2, 9)$

**Step 3:** Plot the points on a coordinate plane to graph the exponential function.



**Step 4:** Compare this graph to the curves in the question and choose the correct answer.

**Answer: W**

### Comparing Graphs of Exponential Functions:

The standard form for an exponential function is shown below.

$$y = ab^x$$

For purposes of comparing graphs of exponential functions, two more variables need to be added, such that the standard form becomes the form shown below.

$$y = ab^{(x+d)} + c$$

The value of  $c$  determines whether the graph shifts upward or downward and the value of  $d$  determines whether the graph shifts right or left. See the table below.

