

7-5 Study Guide and Intervention

Exponential Functions

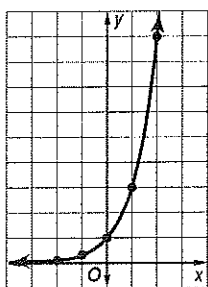
Graph Exponential Functions

Exponential Function a function defined by an equation of the form $y = ab^x$, where $a \neq 0$, $b > 0$, and $b \neq 1$

You can use values of x to find ordered pairs that satisfy an exponential function. Then you can use the ordered pairs to graph the function.

Example 1 Graph $y = 3^x$. Find the y -intercept and state the domain and range.

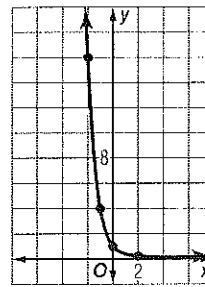
x	y
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9



The y -intercept is 1.
The domain is all real numbers, and the range is all positive numbers.

Example 2 Graph $y = (\frac{1}{4})^x$. Find the y -intercept and state the domain and range.

x	y
-2	16
-1	4
0	1
1	$\frac{1}{4}$
2	$\frac{1}{16}$

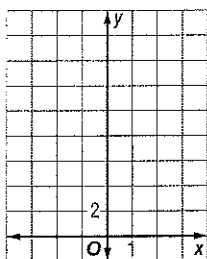


The y -intercept is 1.
The domain is all real numbers, and the range is all positive numbers.

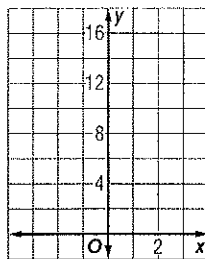
Exercises

Graph each function. Find the y -intercept and state the domain and range.

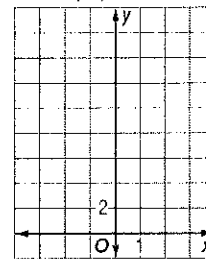
1. $y = 0.3^x$



2. $y = 3x + 1$



3. $y = (\frac{1}{3})^x + 1$



7-5 Study Guide and Intervention *(continued)*

Exponential Functions

Identify Exponential Behavior It is sometimes useful to know if a set of data is exponential. One way to tell is to observe the shape of the graph. Another way is to observe the pattern in the set of data.

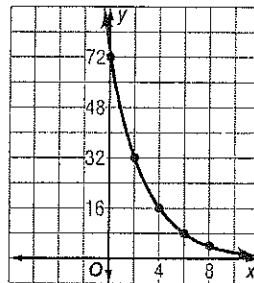
Determine whether the set of data shown below displays exponential behavior. Write *yes* or *no*. Explain why or why not.

x	0	2	4	6	8	10
y	64	32	16	8	4	2

Method 1: Look for a Pattern

The domain values increase by regular intervals of 2, while the range values have a common factor of $\frac{1}{2}$. Since the domain values increase by regular intervals and the range values have a common factor, the data are probably exponential.

Method 2: Graph the Data



The graph shows rapidly decreasing values of y as x increases. This is characteristic of exponential behavior.

Exercises

Determine whether the set of data shown below displays exponential behavior. Write *yes* or *no*. Explain why or why not.

1.

x	0	1	2	3
y	5	10	15	20

2.

x	0	1	2	3
y	3	9	27	81

3.

x	-1	1	3	5
y	32	16	8	4

4.

x	-1	0	1	2	3
y	3	3	3	3	3

5.

x	-5	0	5	10
y	1	0.5	0.25	0.125

6.

x	0	1	2	3	4
y	$\frac{1}{3}$	$\frac{1}{9}$	$\frac{1}{27}$	$\frac{1}{81}$	$\frac{1}{243}$