

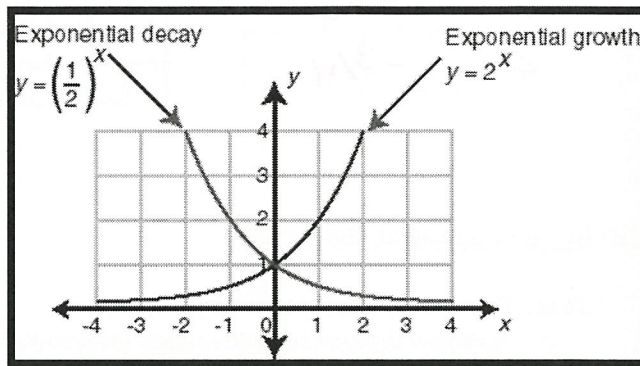
Lesson 7.5 Notes (Exponential Functions)

Objectives:

- Graph exponential functions.
- Identify data that display exponential behavior.

Exponential Function – a function of the form $y = ab^x$ (where $a \neq 0$, $b > 0$, and $b \neq 1$)

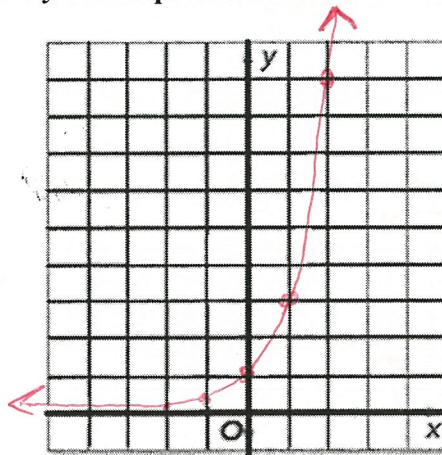
- **Exponential Growth** – base is greater than 1 ($b > 1$)
- **Exponential Decay** – base is between 0 and 1 ($0 < b < 1$)
- You can use values of x to find ordered pairs that satisfy an exponential function. Then you can use the ordered pairs to graph the function.



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

1. $y = 3^x$

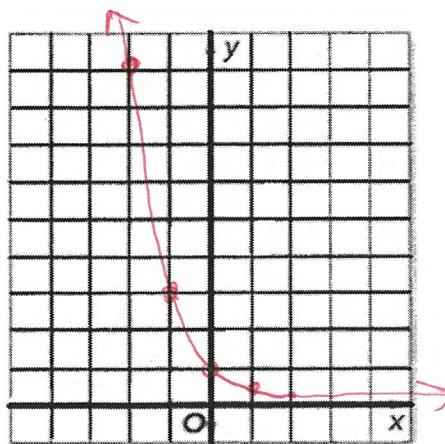
x	y
-2	1/9
-1	1/3
0	1
1	3
2	9



Y-intercept: 1
 Domain: All Real
 Range: $y > 0$

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

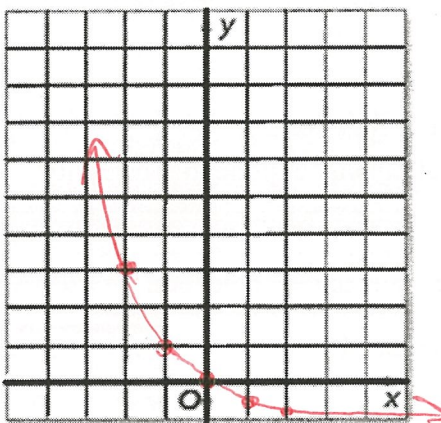
x	y
-2	9
-1	3
0	1
1	1/3
2	1/9



Y-intercept: 1
 Domain: All Real
 Range: $y > 0$

3. $y = (\frac{1}{2})^x - 1$

x	y
-2	3
-1	1
0	0
1	-1/2
2	-3/4



Y-intercept: (0, 0)

Domain: All Real

Range: $y > -1$

Identifying Exponential Behavior

- **Linear Functions** – constant rate of change
 - common difference in the range (add/subtract same number)
- **Exponential Functions** – constant ratios
 - common factor in the range (multiply same number)

Examples: Determine whether each set of data below displays exponential behavior. Write yes or no. Explain why or why not.

4.

x	0	5	10	15	20	25
y	64	32	16	8	4	2

Yes (Common Factor = 1/2)

5.

x	0	3	6	9	12	15
y	12	16	20	24	28	32

No (Common Difference = 4)
"Linear"

6.

x	0	10	20	30
y	10	25	62.5	156.25

Yes (Common Factor = 2.5)