Notes 4-1

Sec 1 H | **Graphing Exponential Functions** | **Unit 4**

Exponential Function: comes from a geometric sequence.

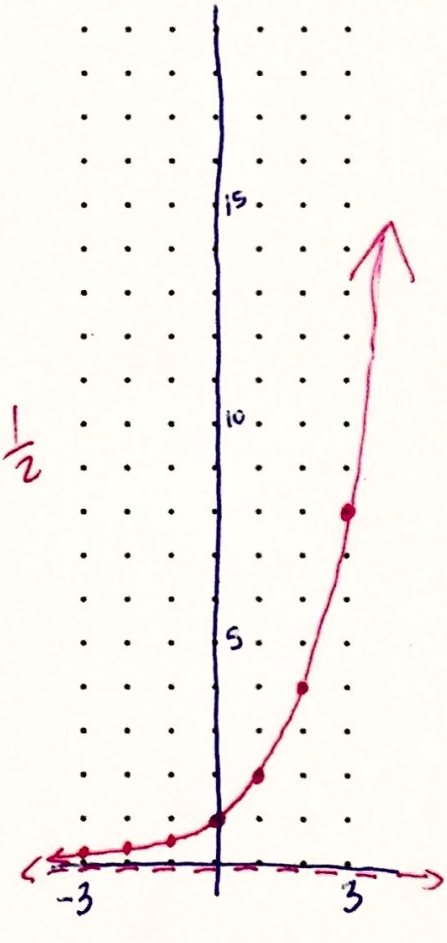
$$y = a \cdot b^x \qquad b > 0$$

a: initial value (y-int)

b: common ratio

Example 1: Graph the function $y = 2^x$

x	$1 \cdot 2^x$	y	
-3	$2^{-3} = \frac{1}{2^3}$	$\frac{1}{8}$	$\cdot \frac{1}{2}$
-2	$2^{-2} = \frac{1}{2^2}$	$\frac{1}{4}$	$\cdot \frac{1}{2}$
-1	$2^{-1} = \frac{1}{2}$	$\frac{1}{2}$	$\div 2$ or $\cdot \frac{1}{2}$
0	$2^0 = 1$	1	$\cdot 2$
1	$2^1 = 2$	2	$\cdot 2$
2	$2^2 = 4$	4	$\cdot 2$
3	$2^3 = 8$	8	

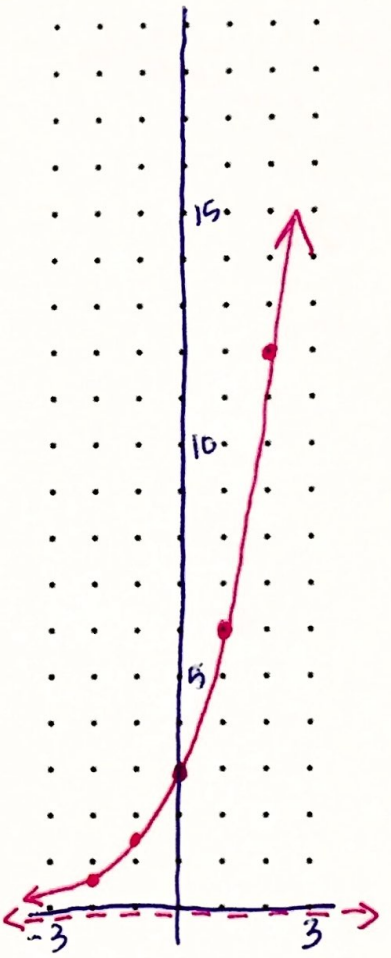


The dotted line is the asymptote.

Asymptote: is a boundary — the graph approaches the line but does not hit or cross it.

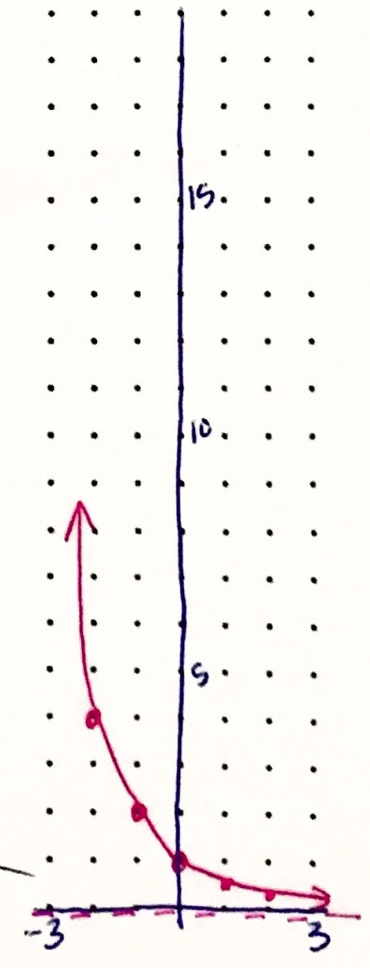
Ex. 2: Graph the function $y = 3(2)^x$

x	$3(2)^x$	y
-2		$\frac{3}{4}$ ↑ ·$\frac{1}{2}$
-1	$3(2)^{-1} = 3 \cdot \frac{1}{2}$	$\frac{3}{2}$ ↑ ·$\frac{1}{2}$
0	$3(2)^0 = 3 \cdot 1$	3 ↓ ·2
1	$3(2)^1 = 3 \cdot 2$	6 ↓ ·2
2	$3(2)^2 = 3 \cdot 4$	12



Ex. 3: Graph the function $y = \left(\frac{1}{2}\right)^x$

x		y
-2		4 ↑ ·2
-1		2 ↑ ·2
0	$\left(\frac{1}{2}\right)^0$	1 ↓ ·$\frac{1}{2}$
1		$\frac{1}{2}$ ↓ ·$\frac{1}{2}$
2		$\frac{1}{4}$



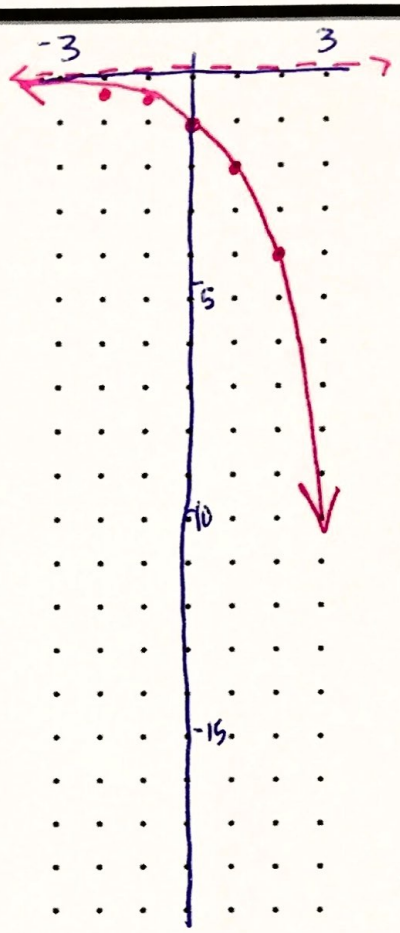
Notes 4-1

Sec 1 H **Graphing Exponential Functions** **Unit 4**

Ex. 4: Graph the function $y = -2^x$ $y = -1 \cdot 2^x$

x		y
-2		$-1/4$
-1		$-1/2$
0	$-1 \cdot 2^0 = -1 \cdot 1$	-1
1		-2
2		-4

$\cdot \frac{1}{2}$ $\cdot \frac{1}{2}$ $\cdot 2$ $\cdot 2$



Ex. 5: What would the graph of $y = (-2)^x$ look like?

	$(-2)^x$	
-2	$(-2)^{-2} = \frac{1}{(-2)^2}$	$1/4$
-1	$(-2)^{-1} = \frac{1}{-2}$	$-1/2$
0	$(-2)^0$	1
1	$(-2)^1$	-2
2	$(-2)^2$	4

Not Exponential