

Algebra 2

6.3 Graphing Logarithmic and Exponential Functions

Things to remember:

- $f(x) = \log_a(x)$ x-int.
(1, 0) and (a, 1)
- cannot take the log of 0 or a negative number
 - doesn't cross the y-axis unless there is a transformation
 - has a vertical asymptote x =
 - you can plug in log base 10 on your calculator

- $f(x) = a^x$ y-int
(0, 1) (1, a)
- (a is any number)
- doesn't cross the x-axis (will never equal a negative #)
 - has a horizontal asymptote y =

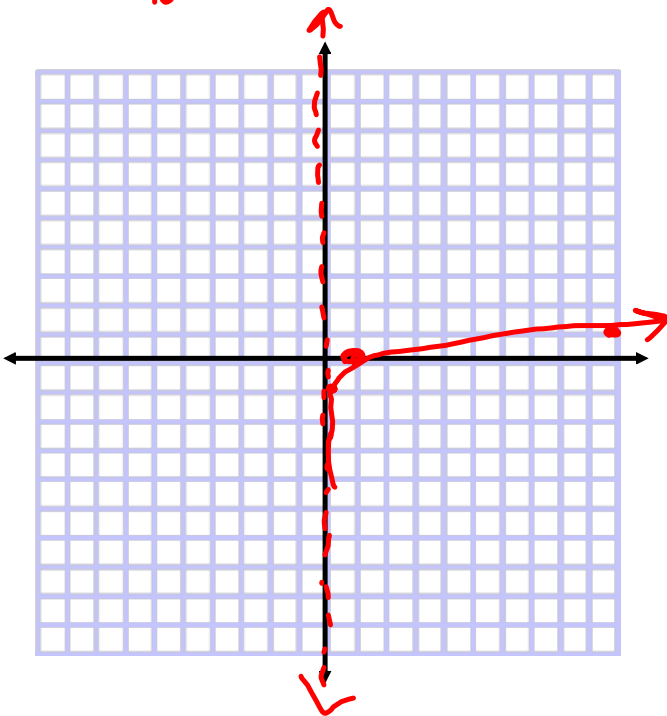
Steps for graphing:

- ✖ 1. Determine the parent function and list the transformations
2. Find the domain and range
- ✖ 3. Find the asymptotes and graph with a dashed line
- ✖ 4. Find the intercepts (if easy) and plot points
5. Use the points of interest and transformations to shift those points.
6. Plug in more values for x if needed to complete the graph.



Graph the function
 $f(x) = \log_{10}(x)$

$$\begin{array}{r} .1 \\ 10 \overline{) 1} \\ \underline{10} \\ 0 \end{array}$$



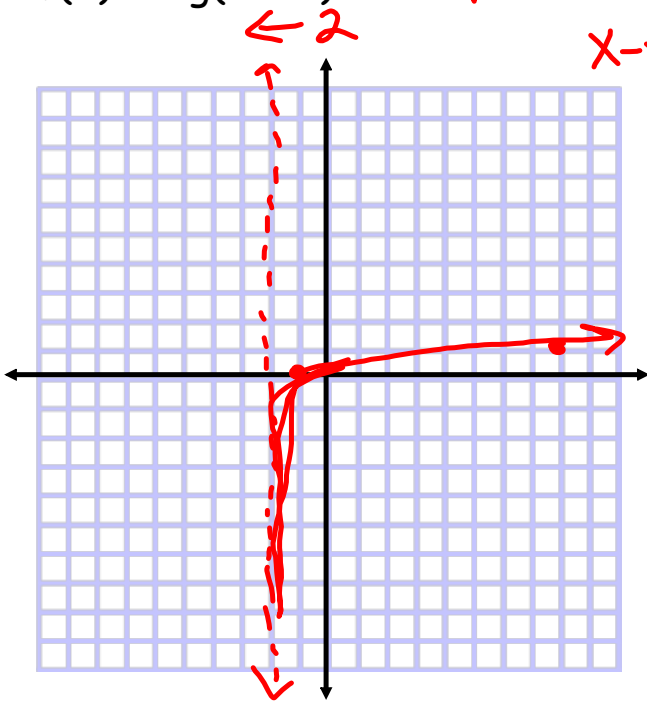
Graph the function

$$f(x) = \log(x + 2)$$

VA: $x = -2$

x-int: 1 but shift 2 left

0, 1 but shift left 2

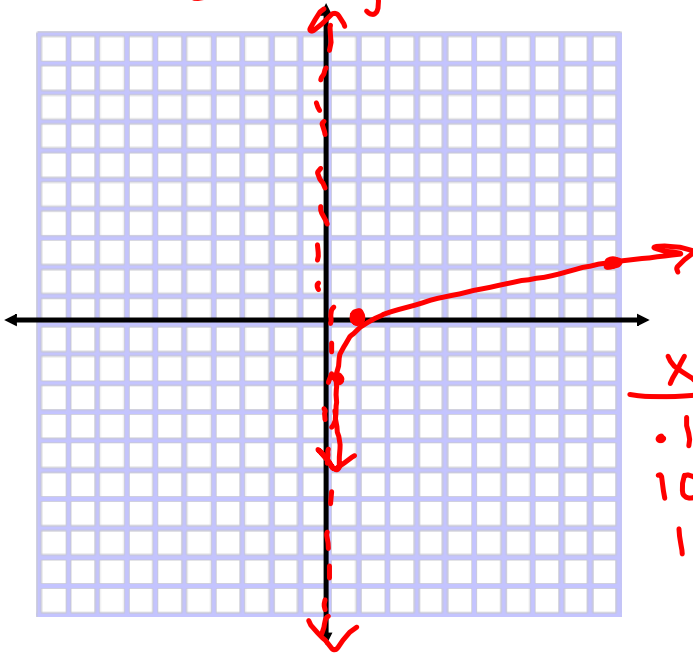


Graph the function

$$VA: x = 0$$

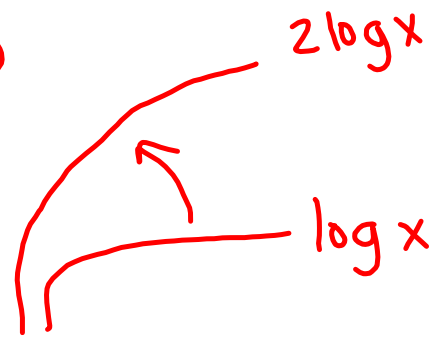
$$f(x) = 2\log(x)$$

↑ closer to y-axis (skinnier)



x	log x
.1	-1
10	1
1	0

x	2 · log x
.1	-2
10	2
1	0



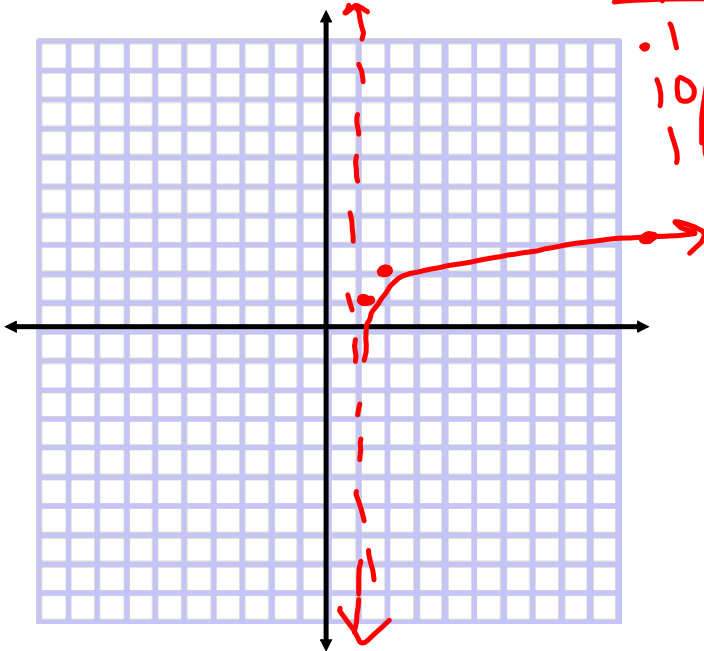
Graph the function

$$f(x) = \log(x - 1) + 2$$

$$VA: x = 1$$

x	log x
.1	-1
10	1
1	0

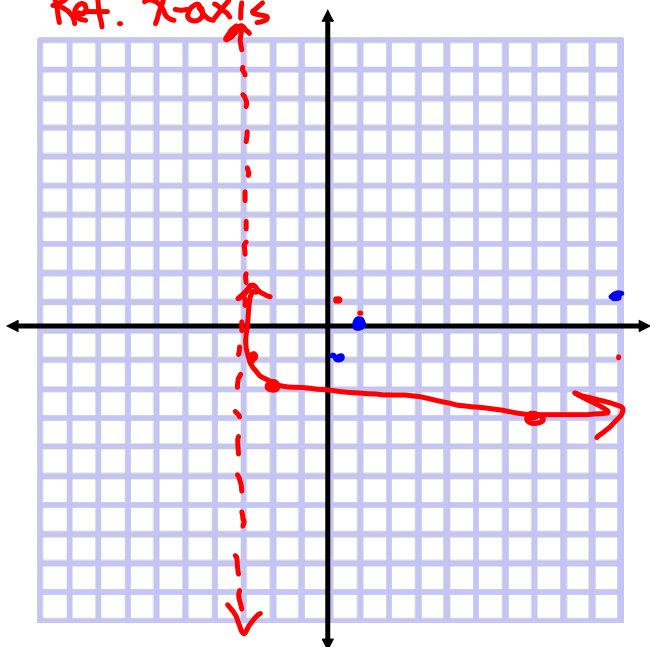
⁺¹ x	⁺² y
1.1	1
11	3
2	2



Graph the function

$$f(x) = -\log(x + 3) - 2$$

Ref. x-axis



$$VA: x = -3$$

$$x + 3 = 0$$
$$x = -3$$

$$-3 \quad \cdot -1 \quad -2$$

x	y
-2.9	-1
7	-3

x	y
.1	-1
10	1
1	0

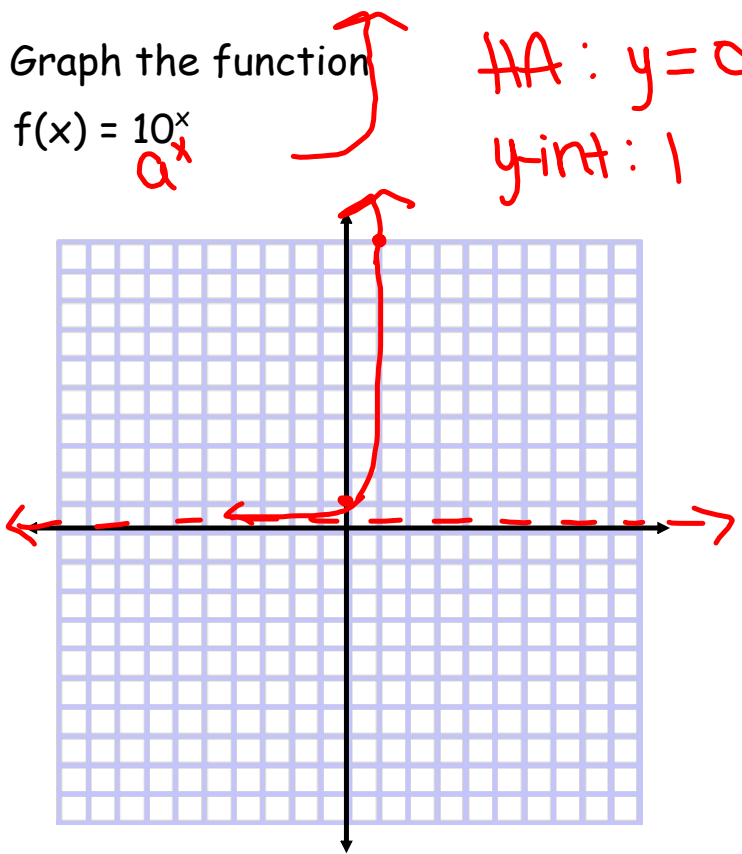
Graph the function

$$f(x) = 10^x$$

$$\text{HA: } y = 0$$

$$\text{y-int: } 1$$

$$(1, a) = (1, 10)$$



Graph the function

$$f(x) = -10^{(x+1)}$$

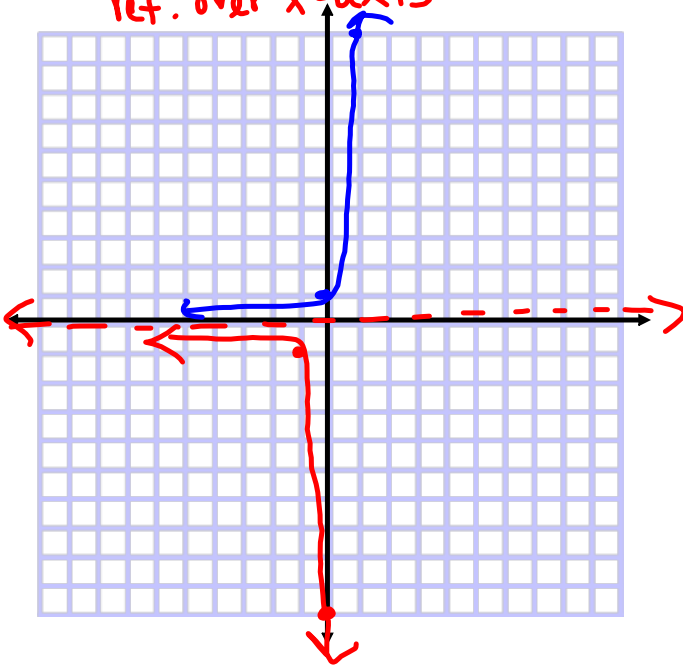
↑
← 1
ref. over x-axis

$$HA: y=0$$

(1, a)

Parent

x	y
0	1
1	10



Graph the function

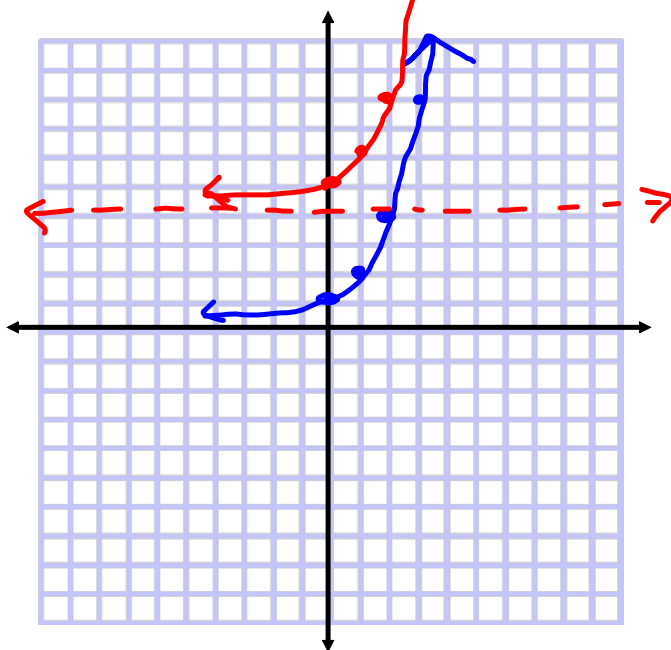
$$f(x) = 2^x + 4$$

↑4

$$HA: y = 4$$

$$(1, a) = (1, 2)$$

Parent $y = 2^x$

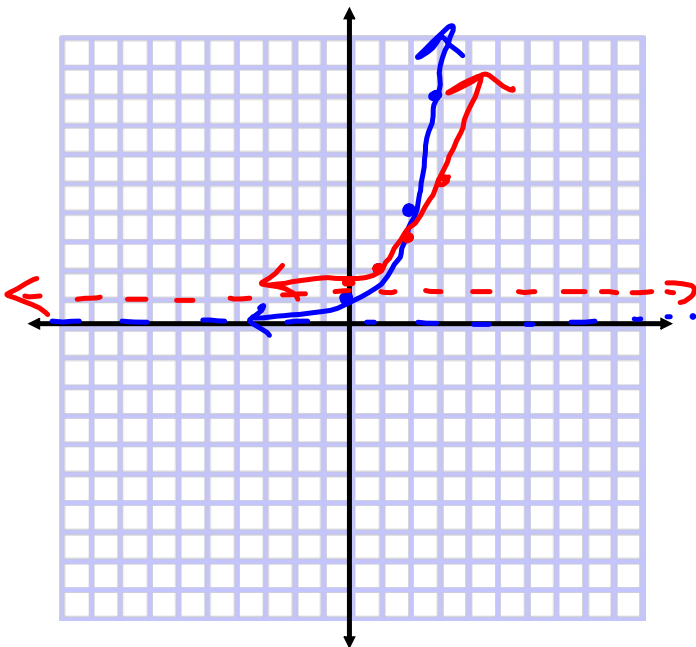


x	y
0	1
1	2
2	4
3	8

Graph the function

$$f(x) = \left(\frac{1}{2}\right)2^x + 1$$

wider ↑ 1



Parent: $y=2^x$

x	y
0	1
1	2
2	4
3	8

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

x	y
0	1.5
1	2
2	3
3	5

Graph the function

$$f(x) = 3^{(x-2)} - 1$$

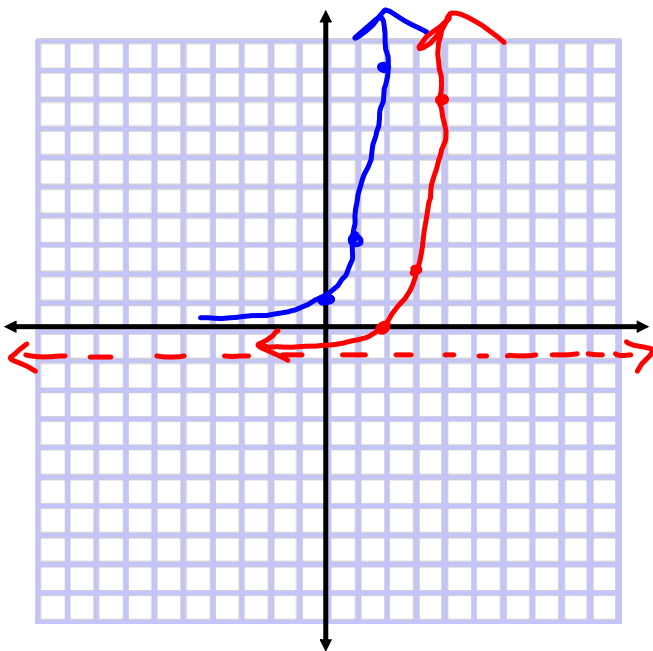
→2 ↓1

HA: $y = -1$

Parent

$$y = 3^x$$

x	y
0	1
1	3
2	9



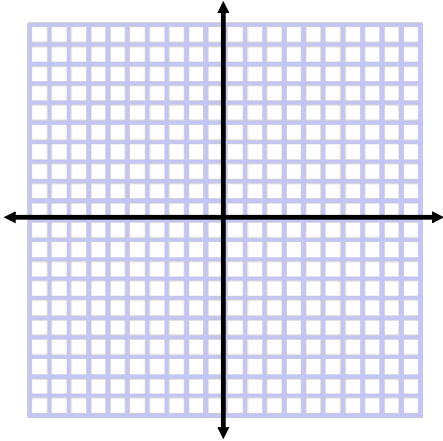
Algebra 2

6.3 Graphing Logarithmic and Exponential Functions Worksheet

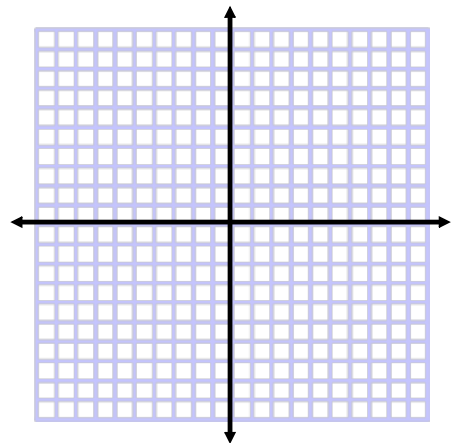
Name: _____ Date: _____ Hour: _____

Graph the given function

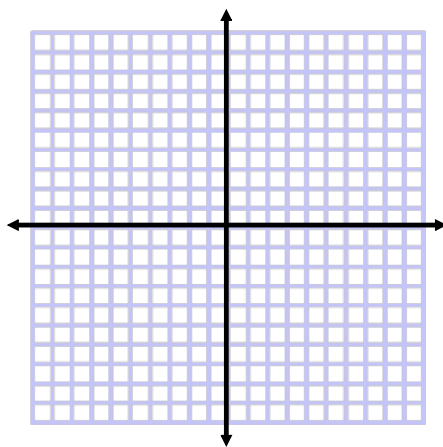
1. $f(x) = \log(x + 1)$



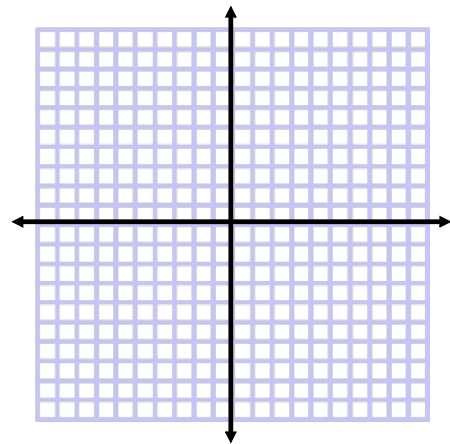
2. $f(x) = -\log(x) + 2$



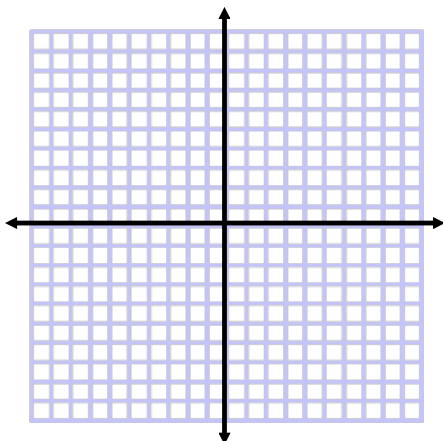
3. $f(x) = \log(x - 2) + 1$



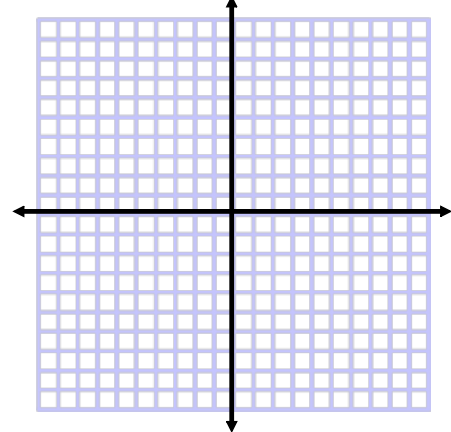
4. $f(x) = 2\log(x + 1)$



5. $f(x) = -\log(x - 3) + 2$

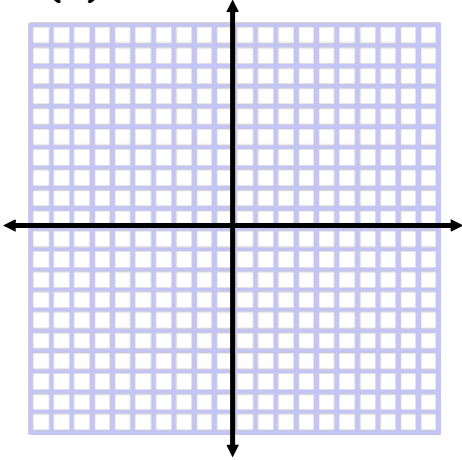


6. $f(x) = \log(x + 2) - 3$

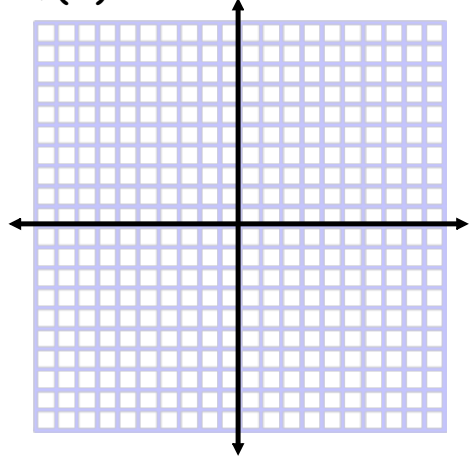


Graph the given function

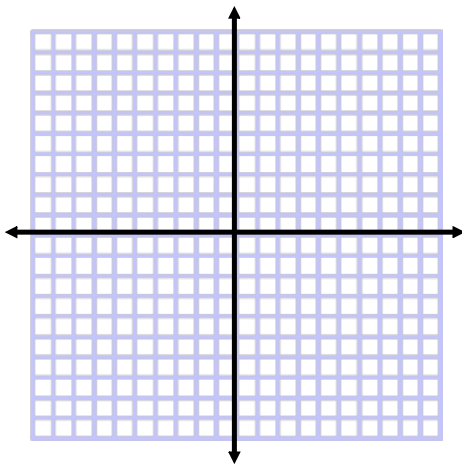
7. $f(x) = -10^{(x-3)}$



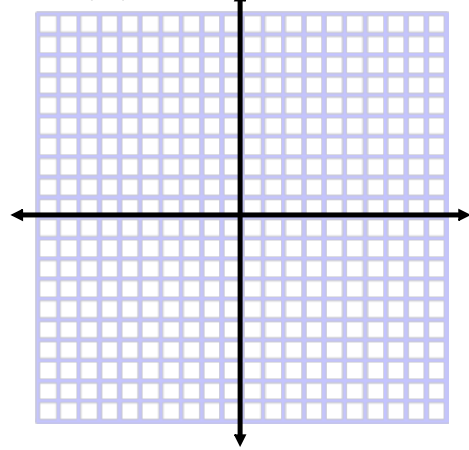
8. $f(x) = 2^{(x+1)} - 2$



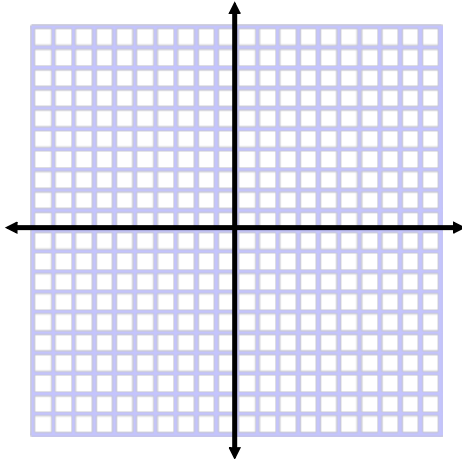
9. $f(x) = (\frac{1}{2})2^{(x)} + 1$



10. $f(x) = 3^{(x+2)} - 3$



11. $f(x) = -3^{(x+2)}$



12. $f(x) = 4^{(x-1)} + 2$

