Graphing Logarithmic function

$f(x) = -\log_4 X + 1$

1) convert the equation to exponential form

$$y = -\log_4 X + 1$$
$$-1 \qquad\qquad -1$$
$$y - 1 = -\log_4 X$$

$$\frac{y-1}{-1} = \frac{-\log_4 X}{-1}$$

$(-y+1) = \log_4 X$ or $4^{-y+1} = X$

There's "0"
$4^{-y+1} = X + 0$
h

h is the asymptote in log.

2) find the asymptote

Note $b^x \neq 0$

remember $y = 2^x$

X	y
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4

2^x never reaches 0.

$\Rightarrow$

So,

$4^{-y} + 1 \neq 0$

$0 \neq X$

X cannot be 0

x can't never reach 0

asymptote:

$X = 0$

3) Draw the asymptote line

4) find the x and y values that are simple to find according to the function

$$4^{-y+1} = x$$

think $4^0 = 1$

$-y+1=0$

$-y=-1$

$y=1$

$x=1$

x	y
1	1
4	0

think $4^1 = 4$

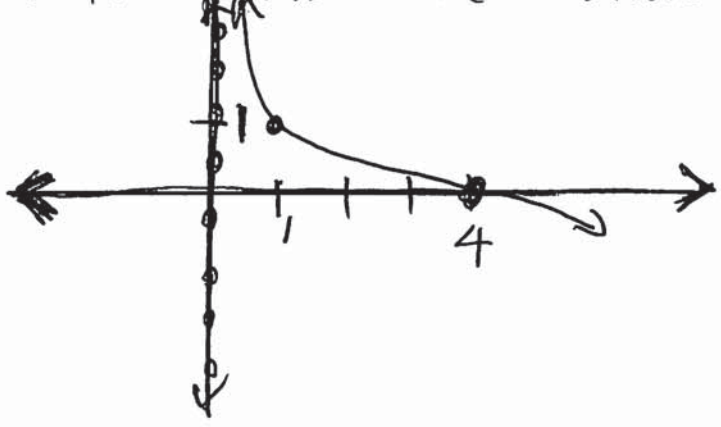
$-y+1=1$

$-y=0$

$y=0$

$x=4$

5) Plot the two points and sketch the line



Name Key Per. ____ Date ____ Score ____

HW27: Activity 21 Worksheet (Graphing Exponential and Logarithmic Functions)

Never reaches 0 → $b^x \neq 0$

Graph and determine the domain and range of g.

1) $g(x) = -\log_3(x+1)$

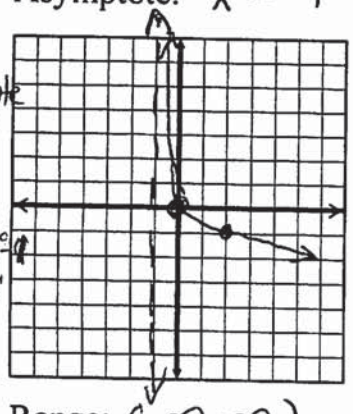
$y = -\log_3(x+1)$

$-y = \log_3(x+1)$

$3^{-y} = (x+1)$ → h asymptote

x	y
0	0
2	-1

Asymptote: $x = -1$

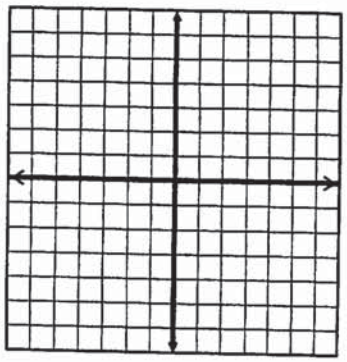


Domain: $(-1, \infty)$ Range: $(-\infty, \infty)$

x	y
-2	$\frac{1}{b^2}$
-1	$\frac{1}{b}$
0	1
1	b
2	b^2

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

Asymptote:



Domain: Range:

3) $g(x) = e^{-x} + 3$

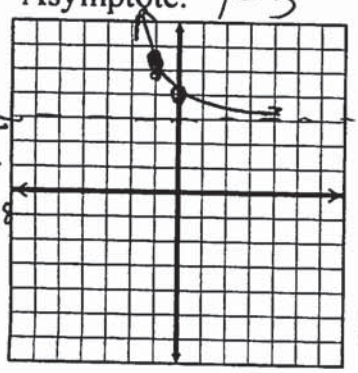
$y = (e^{-x}) + 3$ → k asymptote

$y \neq 0 + 3$

$y \neq 3$ → can't reach

Asymptote: $y = 3$

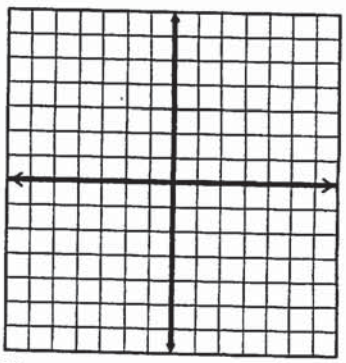
x	y
0	4
-1	5.718



Domain: $(-\infty, \infty)$ Range: $(3, \infty)$

4) $g(x) = \ln(x-2) - 3$

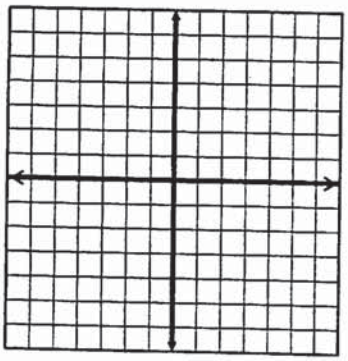
Asymptote:



Domain: Range:

5) $g(x) = \log_3(x-1) + 2$

Asymptote:



Domain: Range:

6) $g(x) = \left(\frac{1}{2}\right)^{x+2} - 3$

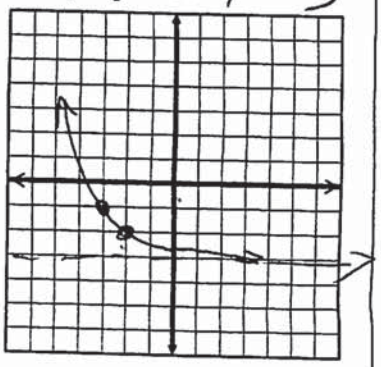
$y = \left(\frac{1}{2}\right)^{x+2} - 3$

$y \neq 0 - 3$

$y \neq -3$ → can't reach

x	y
-2	-2
-3	-1

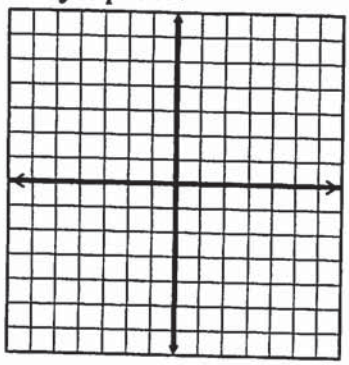
Asymptote: $y = -3$



Domain: $(-\infty, \infty)$ Range: $(-3, \infty)$

7) $g(x)=(3)^x-1$

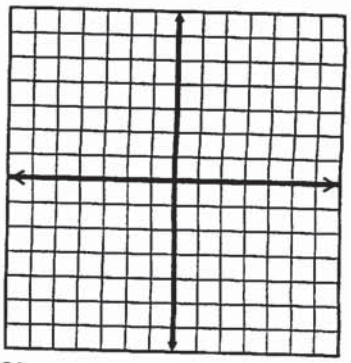
Asymptote:



Domain: Range:

8) $g(x)=\ln(-x)-1$

Asymptote:



Domain: Range:

9) $g(x)=\log_2(x-2)-1$

$Y=\log_2(X-2)-1$

$Y+1=\log_2(X-2)$

$2^{Y+1}=X-2$

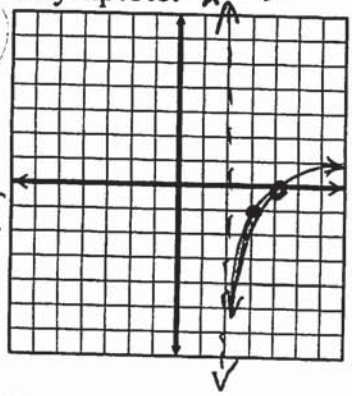
$0\neq X-2$

$+2 \quad +2$

$2\neq X$

X	y
3	-1
4	0

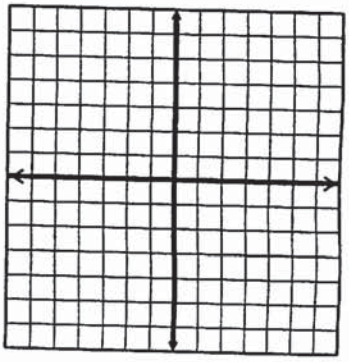
Asymptote: $X=2$



Domain: $(2,\infty)$ Range: $(-\infty,\infty)$

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

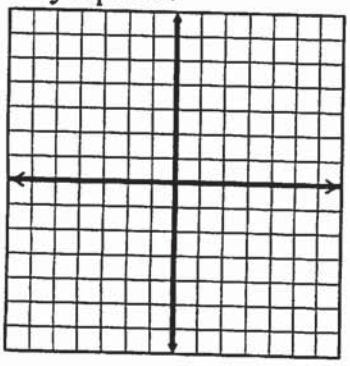
Asymptote:



Domain: Range:

11) $g(x)=2^{x+2}-1$

Asymptote:



Domain: Range:

12) $f(x)=-\log_4 x+1$

$Y=-\log_4 X+1$

$Y-1=-\log_4 X$

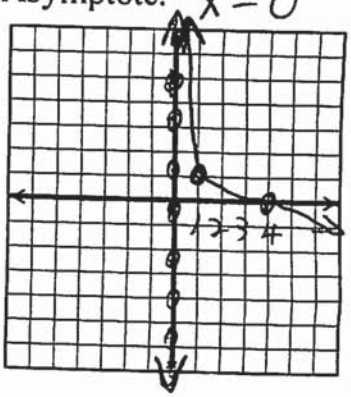
$(-Y+1)=\log_4 X$

$4^{-Y+1}=X$

$0\neq X$

X	y
1	1
4	0

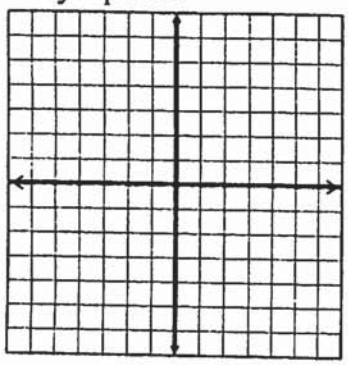
Asymptote: $X=0$



Domain: $(0,\infty)$ Range: $(-\infty,\infty)$

7) $g(x) = (3)^x - 1$

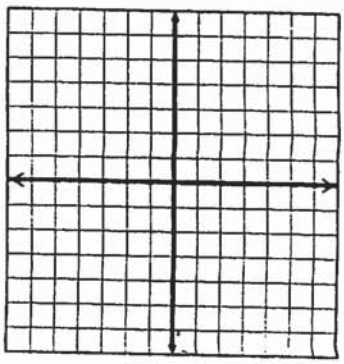
Asymptote:



Domain: Range:

8) $g(x) = \ln(-x) - 1$

Asymptote:



Domain: Range:

9) $g(x) = \log_2(x-2) - 1$

$Y = \log_2(X-2) - 1$

$Y+1 = \log_2(X-2)$

$2^{Y+1} = X-2$

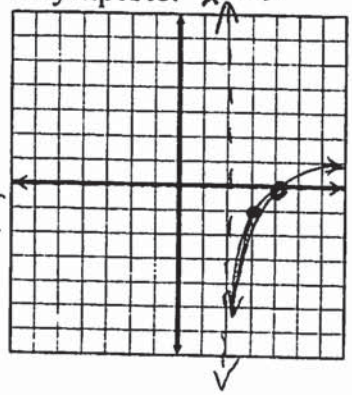
$0 \neq X-2$

$+2 \quad +2$

$2 \neq X$

X	y
3	-1
4	0

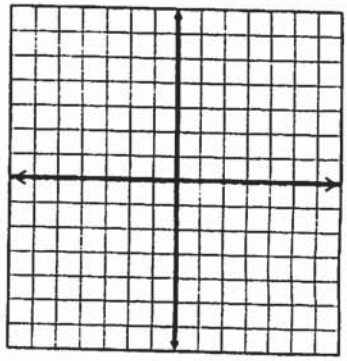
Asymptote: $X = 2$



Domain: $(2, \infty)$ Range: $(-\infty, \infty)$

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

Asymptote:



Domain: Range:

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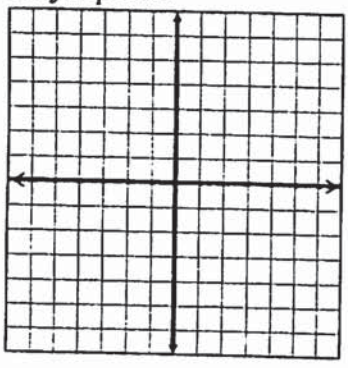
Asymptote:



Domain: Range:

12) $f(x) = -\log_4 x + 1$

$Y = -\log_4 X + 1$

$Y - 1 = -\log_4 X$

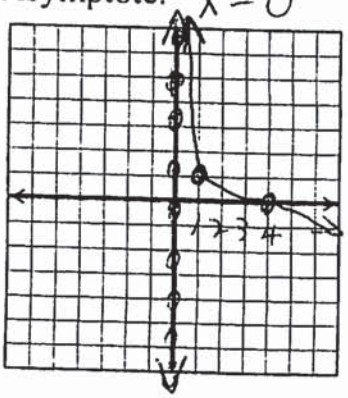
$(-Y+1) = \log_4 X$

$4^{-Y+1} = X$

$0 \neq X$

X	y
1	1
4	0

Asymptote: $X = 0$



Domain: $(0, \infty)$ Range: $(-\infty, \infty)$