Identify the y-intercept: $y = \underline{a} \cdot b^x + \underline{k}$

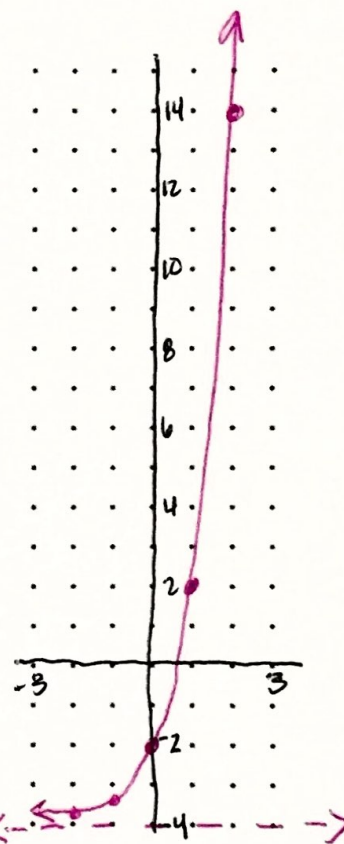$$\left(0, \; a + k \right)$$

Identify the asymptote:

$$y = k$$

Graph.

Ex. 1: $f(x) = \boxed{2(3)^x} - 4$

x	$2(3)^x$ y -4	
$-2, \frac{1}{3}$	$\frac{2}{9}$ -4	$-3\frac{7}{9}$
$-1, \frac{1}{3}$	$\frac{2}{3}$ -4	$-3\frac{1}{3}$
0	2	-2
1	6 -4	2
2	18 -4	14

What is the y-intercept? $\left(0, \; 2 + {-4} \right) = \left(0, -2 \right)$

Where is the asymptote? $y = -4$

Are the functions increasing or decreasing?
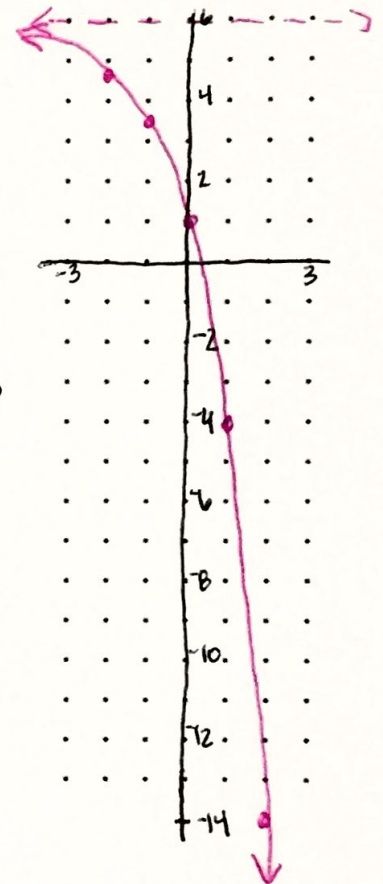
Are the functions above or below their asymptotes?

Graph.

Ex. 2: $f(x) = -5(2)^x + 6$

x	$-5(2)^x + 6$	y
-2 $\frac{1}{2}$	$-\frac{5}{4}$	$4\frac{3}{4}$
-1 $\frac{1}{2}$	$-\frac{5}{2}$	$3\frac{1}{2}$
0	-5	1
1	-10	-4
2	-20	-14

What is the y-intercept? $(0, -5+6)$
$(0, 1)$

Where is the asymptote? $y = 6$

Are the functions increasing or (decreasing?)

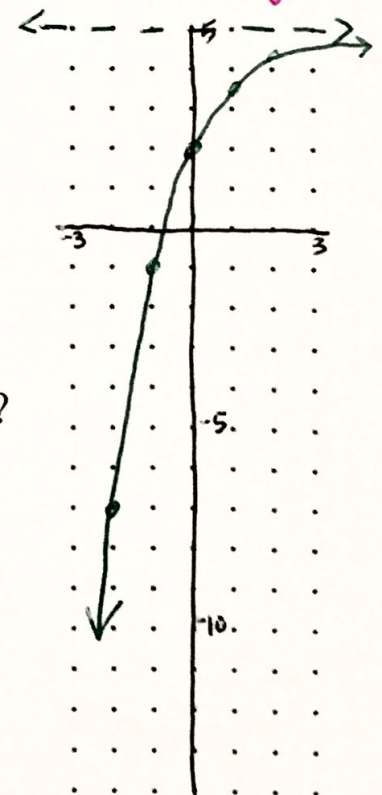Are the functions above or (below) the asymptotes?

Ex. 3: $f(x) = -3\left(\dfrac{1}{2}\right)^x + 5$

x	$-3\left(\frac{1}{2}\right)^x + 5$	y
-2	-12	-7
-1	-6	-1
0	-3	2
1	$-\frac{3}{2}$	$3\frac{1}{2}$
2	$-\frac{3}{4}$	$4\frac{1}{4}$

What is the y-intercept? $(0, 2)$

Where is the asymptote? $y = 5$

Are the functions increasing or decreasing?

Are the functions above or below the asymptotes?

Example 4:

For this problem you are given the parent function $f(x) = -2(3)^x$ and a second

   function $g(x) = -2(3)^x + 4$ that has been shifted vertically.

a) Create a table for both $f(x)$ and $g(x)$.

b) Graph both $f(x)$ and $g(x)$ on the same graph. Use graph paper. Make sure to
     label your axis and draw the asymptotes.
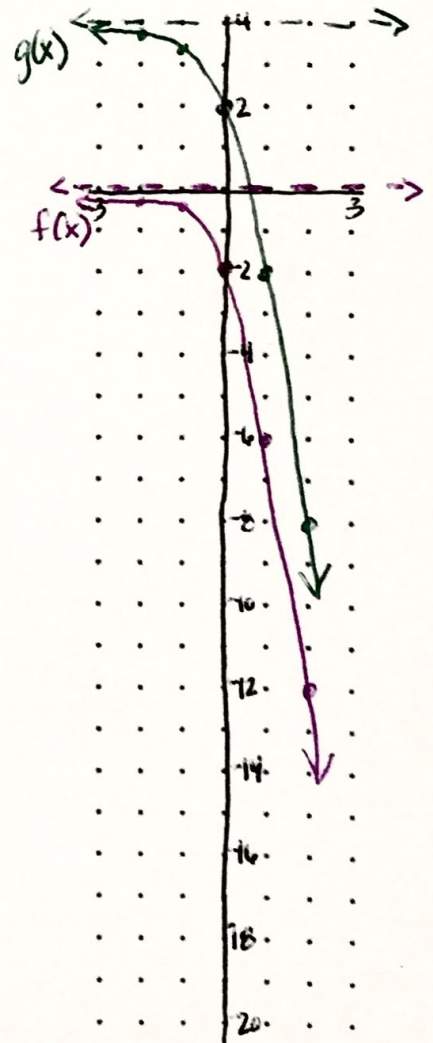
c) Answer the following questions.

What is the y-intercept? $f(x)$: __(0,-2)__ $g(x)$: __(0, 2)__

Where is the asymptote? $f(x)$: __y=0__ $g(x)$: __y=4__

Are the functions increasing or ~~decreasing?~~

Are the functions above or ~~below~~ their asymptotes?

X	$f(x) = -2(3)^x$	$g(x) = -2(3)^x + 4$
-2	$-\frac{2}{9}$	$3\frac{7}{9}$
-1	$-\frac{2}{3}$	$3\frac{1}{3}$
0	-2	2
1	-6	-2
2	-12	-8

Identify the *y*-intercept and the asymptote for each function.

Ex. 5: $f(x) = 4(2)^x - 1$

y-int: $(0, 4-1) \rightarrow (0, 3)$

asym: $y = -1$

Ex. 6: $g(x) = -5(2)^x$

y-int: $(0, -5)$

asym: $y = 0$

Ex. 7: $h(x) = 5^x - 7$

y-int: $(0, 1-7) \rightarrow (0, -6)$

asym: $y = -7$

Ex. 8: $f(x) = \dfrac{1}{4}(3)^x + 1$

y-int: $(0, \frac{1}{4}+1) \rightarrow (0, 1\frac{1}{4})$

asym: $y = 1$

Ex. 9: $f(x) = -9(2)^x + 17$

y-int: $(0, 8)$

asym: $y = 17$