Selected Answers

Name: _____ Period: _____

### HW 4-2 HONORS: Exponential Equations & Vertical Shifts

For each problem you are given a parent function and a second equation that has been shifted vertically.

a) Fill in the table for $g(x)$.

b) Given the graph of the parent function $f(x)$, graph $g(x)$ on the same graph. Make sure that you draw in the asymptotes for both $f(x)$ and $g(x)$.

c) Identify the y-intercept and asymptote.

$f(x) = 3^x$ and $g(x) = 3^x + 6$

1.

x	Work	$f(x) = 3^x$	$g(x) = 3^x + 6$
-2		$\frac{1}{9}$	$6\frac{1}{9}$
-1		$\frac{1}{3}$	$6\frac{1}{3}$
0		1	7
1		3	9
2		9	15
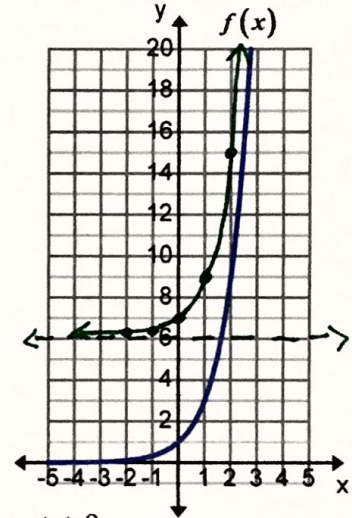
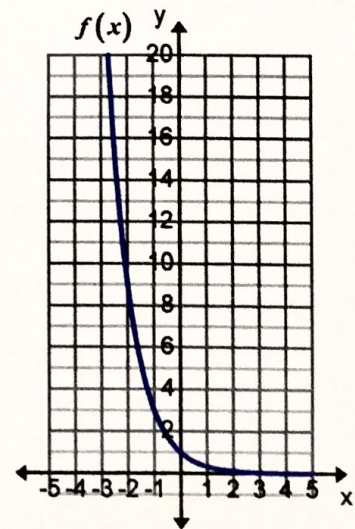2. What is the y-intercept?

$f(x)$: _____ $g(x)$: _____

3. Where is the asymptote?

$f(x)$: X-axis $g(x)$: y = 6

$f(x) = \left(\frac{1}{3}\right)^x$ and $g(x) = \left(\frac{1}{3}\right)^x + 5$

4.

x	Work	$f(x) = \left(\frac{1}{3}\right)^x$	$g(x) = \left(\frac{1}{3}\right)^x + 5$
-2		9	
-1		3	
0		1	
1		$\frac{1}{3}$	
2		$\frac{1}{9}$	

5. What is the y-intercept?

$f(x)$: (0, 1) $g(x)$: (0, 6)

6. Where is the asymptote?

$f(x)$: _____ $g(x)$: _____

For each problem you are given a parent function and a second equation that has been shifted vertically.
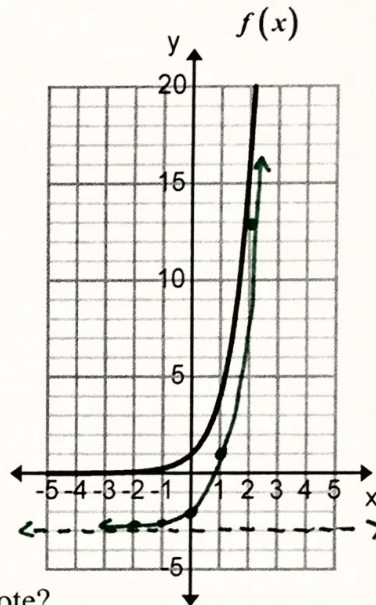a) Fill in the table for $g(x)$.
b) Given the graph of the parent function $f(x)$, graph $g(x)$ on the same graph. Make sure that you draw in the asymptotes for both $f(x)$ and $g(x)$.
c) Identify the y-intercept and asymptote.

$f(x) = 4^x$ and $g(x) = 4^x - 3$

$f(x)$

7.

x	Work	$f(x) = 4^x$	$g(x) = 4^x - 3$
-2		$\frac{1}{16}$	$-2\frac{15}{16}$
-1		$\frac{1}{4}$	$-2\frac{3}{4}$
0		1	-2
1		4	1
2		16	13

8. What is the y-intercept?
$f(x)$: _____ $g(x)$: _____

9. Where is the asymptote?
$f(x)$: __X-axis__ $g(x)$: __$y = -3$__

$f(x) = 2(6)^x$ and $g(x) = 2(6)^x - 3$

$f(x)$

10.

x	Work	$f(x) = 2(6)^x$	$g(x) = 2(6)^x - 3$
-2		$\frac{1}{18}$	
-1		$\frac{1}{3}$	
0		2	
1		12	
2		72	
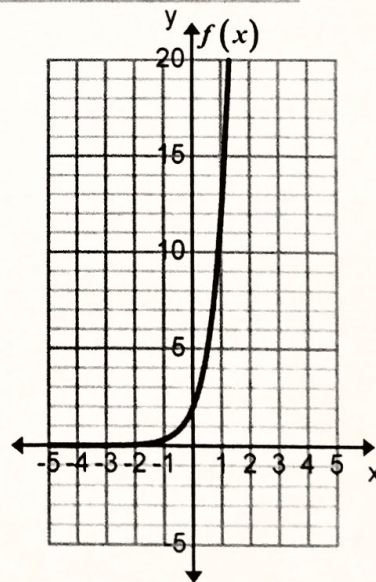
11. What is the y-intercept?
$f(x)$: __$(0, 2)$__ $g(x)$: __$(0, -1)$__

12. Where is the asymptote?
$f(x)$: _____ $g(x)$: _____

For each problem you are given a parent function and a second equation that has been shifted vertically. Create a table for both $f(x)$ and $g(x)$ and answer the following questions.

● $f(x) = 2^x$ and $g(x) = 2^x + 4$

13.

x	Work	$f(x) = 2^x$	$g(x) = 2^x + 4$
-2		$\frac{1}{4}$	$4\frac{1}{4}$
-1		$\frac{1}{2}$	$4\frac{1}{2}$
0		1	5
1		2	6
2		4	8

14. What is the y-intercept?

$f(x)$: _____ $g(x)$: _____

15. Where is the asymptote?

$f(x)$: _X-axis_ $g(x)$: _y=4_

16. Are these functions increasing or decreasing?

17. Are these functions above or below the asymptote?

above

$f(x) = \left(\frac{1}{2}\right)^x$ and $g(x) = \left(\frac{1}{2}\right)^x - 4$

18.

x	Work	$f(x) = \left(\frac{1}{2}\right)^x$	$g(x) = \left(\frac{1}{2}\right)^x - 4$
-2			
-1			
0			
1			
2			

19. What is the y-intercept?

$f(x)$: _(0, 1)_ $g(x)$: _(0, -3)_

● **20.** Where is the asymptote?

$f(x)$: _____ $g(x)$: _____

21. Are these functions increasing or decreasing?

decreasing

22. Are these functions above or below the asymptote?

$f(x) = -(6)^x$ and $g(x) = -(6)^x - 2$

23.

x	Work	$f(x) = -(6)^x$	$g(x) = -(6)^x - 2$
-2		$-\frac{1}{36}$	$-2\frac{1}{36}$
-1		$-\frac{1}{6}$	$-2\frac{1}{6}$
0		-1	-3
1		-6	-8
2		-36	-38

24. What is the y-intercept?

$f(x)$: _____ $g(x)$: _____

25. Where is the asymptote?

$f(x)$: _▓▓▓▓_ $g(x)$: _▓▓▓▓_
   X-axis   y=-2

26. Are these functions increasing or decreasing?

● **27.** Are these functions above or below the asymptote?

below

For each problem you are given a parent function and a second equation that has been shifted vertically. Create a table for both $f(x)$ and $g(x)$ and answer the following questions.

$f(x) = -3(4)^x$ and $g(x) = -3(4)^x + 5$

29. What is the *y*-intercept?

$f(x)$: $(0,-3)$ $g(x)$: $(0,2)$

30. Where is the asymptote?

$f(x)$: _____ $g(x)$: _____

31. Are these functions increasing or decreasing?

decreasing

32. Are these functions above or below the asymptote?

28.

x	Work	$f(x) = -3(4)^x$	$g(x) = -3(4)^x + 5$
-2			
-1			
0			
1			
2			