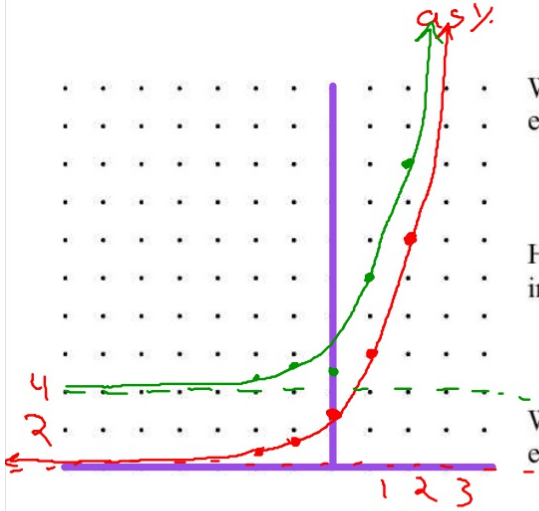
Example 1: $f(x)=3(2)^x$ & $g(x)=3(2)^x+4$ $g(x)=f(x)+4$

For the functions above, complete the table of values and sketch the graph of the function. Label the asymptote.

x	f(x)	g(x)
2	12	16
1	6	10
0	3	7
-1	1.5	5.5
-2	0.75	4.75
-3	0.375	4.375
-4	0.1875	4.1875
-5	0.09	4.09
-6	0.05	4.05
-7	0.02	4.02
-10	0.003	4.003



What did the +4 do in the equation?

How could you find the *y*-intercept from the equation?

Where is the growth factor in the equation?

$f(x)=a(b)^x+c$ $a(b)^0+c$ $a\cdot 1+c$ $a+c$

What does the **+c** do in the equation?

moves it up c units

How could you find the ***y*-intercept** from the equation?

a + c

Where is the **growth factor** in the equation?

b

Example 3: $f(x)=2(3)^x-2$

Graph the function above by first, graphing the y-intercept & asymptote and then make a small table for a few more points.

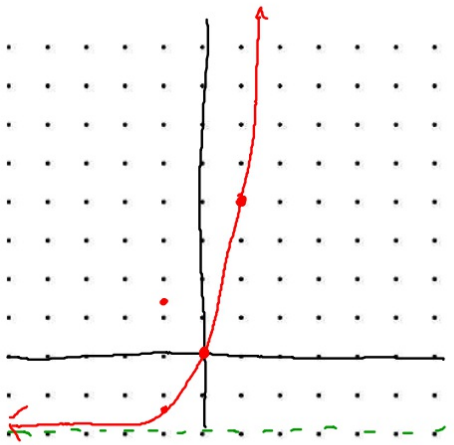
y-int. (0, 0)

asy. −2

$2(3)^2-2$

$2(3)^1-2$

$2(3)^{-1}-2$



Example 4:

Write an exponential equation that matches the following criteria or graph.

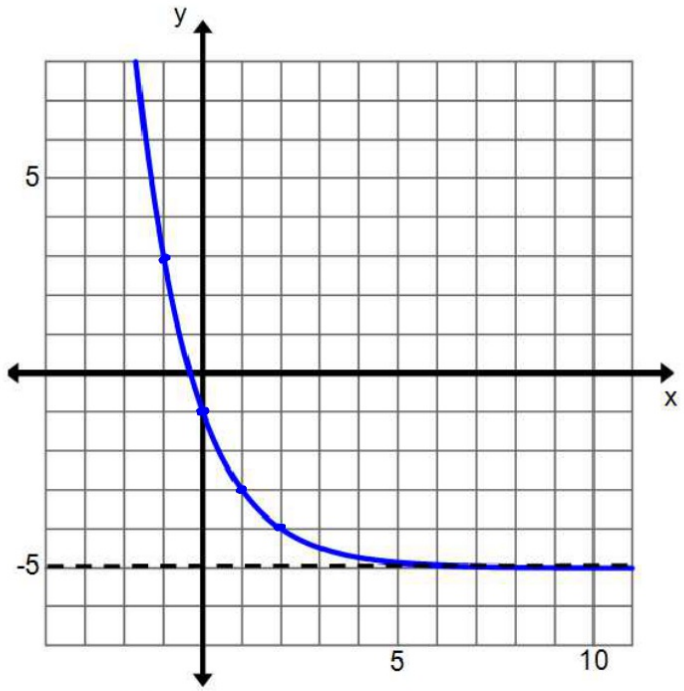
A. Growth Factor : 7
y-intercept: 3
asymptote: -8

$y = 11(7)^x - 8$

$f(x) = 11(7)^x - 8$

~~$y = -5(7)^x - 8$~~

B.



$y = f(x) = 4\left(\frac{1}{2}\right)^x - 5$

Match the function with its correct asymptote and y-intercept.

3. $f(x) = 5(3)^x + 2$ ~~A~~ (B) ~~A~~

4. $g(x) = 2(3)^x + 5$ A B (C)

5. $h(x) = 1(3)^x + 2$ (A) B C

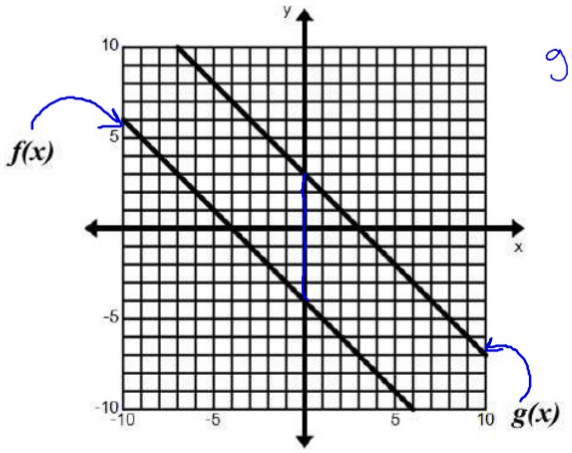
A. asymptote: $y = 2$
y-intercept: $(0, 3)$

B. asymptote: $y = 2$
y-intercept: $(0, 7)$

C. asymptote: $y = 5$
y-intercept: $(0,7)$

Example 2

A. The graphs of two functions $f(x)$ and $g(x)$ are shown below. Write a rule for $g(x)$ in terms of $f(x)$.



$g(x) = f(x) + 7$

B. For the graphs of $f(x)$ and $g(x)$ shown above, write a rule for $f(x)$ in terms of $g(x)$.

$f(x) = g(x) - 7$

$f(x) = 2x + 1$
$g(x) = 2x - 2$
$g(x) = f(x) - 3$

Example 3 $f(x) = 2x + 1$ and $g(x) = 2x - 2$. If $g(x)$ can be written as $f(x) + k$, what is the value of k?

Sec1H | Notes 7-2 Shifting Exponential Functions in Context | Unit 7

Example 4 (Constants & Exponential Functions) - Mark gets $1000 from his grandpa. He hides $200 in his house and doesn't spend it. He places the remaining $800 in a savings account that pays 3% annual interest compounded quarterly. Write an equation to calculate how much money will be in the savings account after x years. Ignore the money in the savings account for now. Don't worry about the $200 that is hidden yet.

Equation:

Use the equation to fill out the table below.

Years	*Amount in Savings Account*	*Total (Including the Hidden Money)*
0		
1		
2		
3		
4		

Write an equation to include the money in savings and the extra $200 hidden. What is the initial value of this equation?

Sec1H	Notes 7-2 Shifting Exponential Functions in Context	Unit 7

Practice -

a $r = .025$

1. You place \$7,500 in an account that pays you 2.5% interest compounded daily. When you withdraw the money you will pay a \$150 fee (no matter when you withdraw the money). Write an equation to calculate how much you will get if you withdraw your money after x years. $n = 365$

$$7500\left(1+\frac{.025}{365}\right)^{365x} - 150$$

2. A farmer has 50 chickens that he gathers eggs from. This population will not increase or decrease. He has another group of 200 chickens that he hopes will increase by 15% each year. Write an equation to calculate how many chickens the farmer hopes to have based on how many years it has been.

$$f(x) = 200(1+.15)^{x} + 50$$

For your reference on the homework, write the general formats for percent growth equations, percent decay equations, and compound interest here. You will need them on the homework.

Growth $f(x) = a(1+r)^{x}$

Decay $f(x) = a(1-r)^{x}$

Compound Interest $f(x) = a\left(1+\frac{r}{n}\right)^{n \cdot x}$