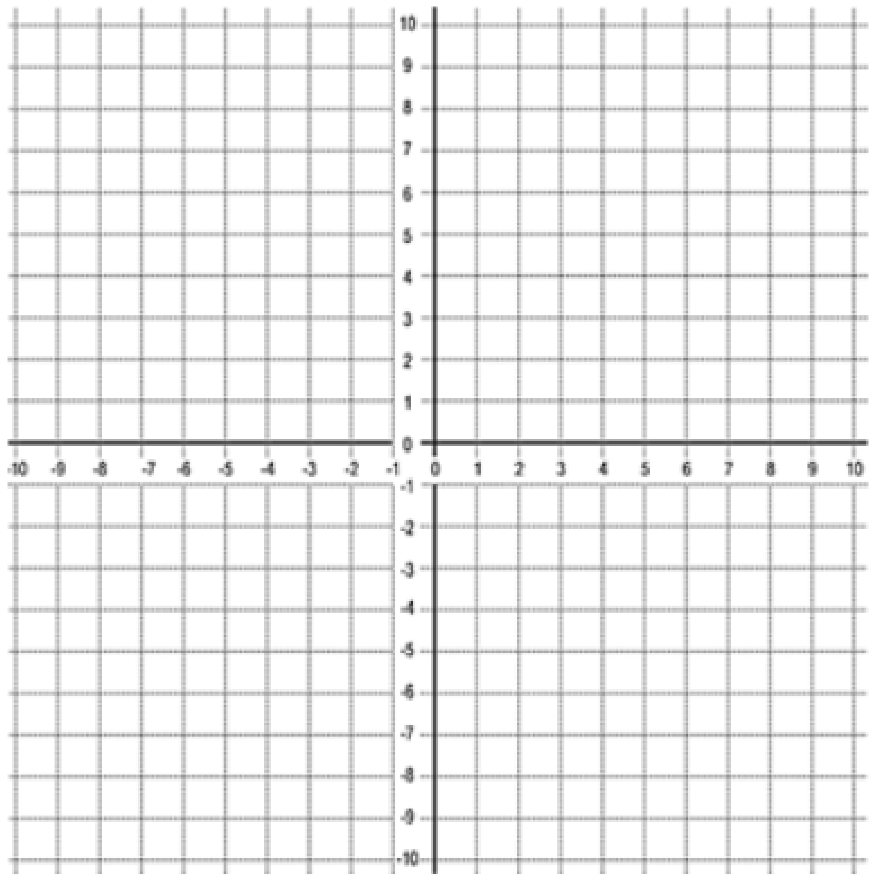
<u>Exponential Graph Discovery</u>　　　　　　　　　　　　　**Ponce de** ______________________________

<u>H-Algebra 2</u>　　　　　　　　　　　　　　　　　　　　　**Date** ________________ **Period** _________

Fill in the tables WITH RATIONAL VALUES and use them to create a graph. Since we are graphing functions in function notation – f(x), etc – they are continuous functions. (What does that mean?) Use your graphs to answer the questions. You will be asked questions about the relationships among these graphs, so be sure to note *why* things change, not just how.

1. $f(x) = 2^x$

x	f(x) as fraction	f(x) as decimal approximation
-10		
-9		
-8		
-7		
-6		
-5		
-4		
-3		
-2		
-1		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



Will this graph ever touch the x-axis? Why or why not?

If not, is there an asymptote? What would its equation be?

State the DOMAIN of the function f(x) = 2^x in interval notation:

State the RANGE of the function f(x) = 2^x in interval notation:

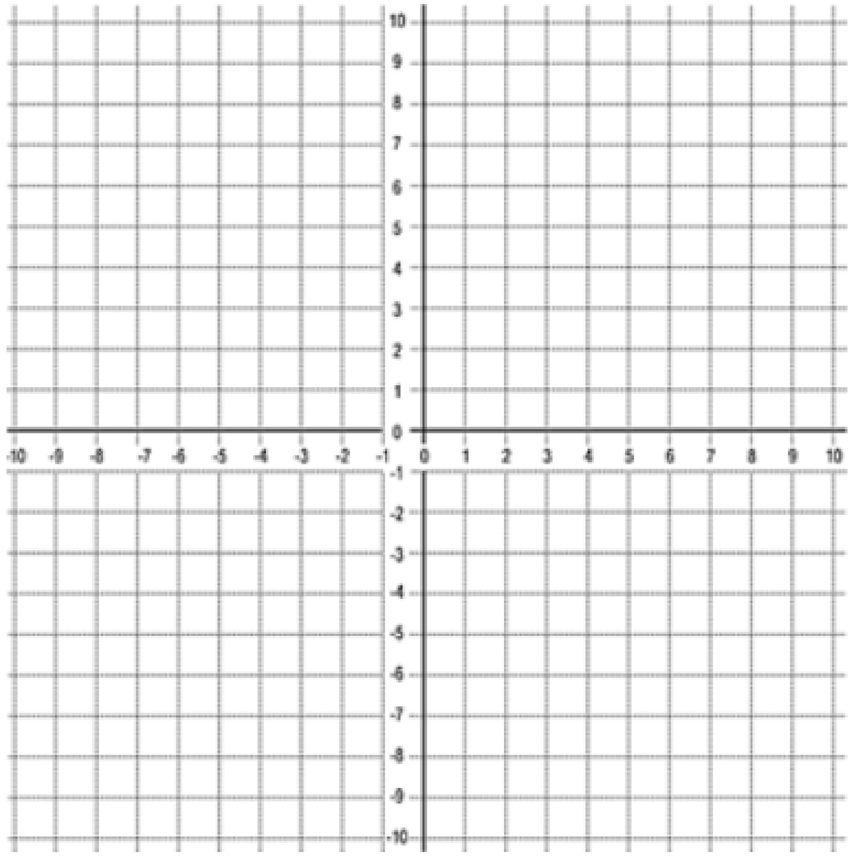
State the end behavior of the function f(x) = 2^x: as $x \to -\infty,\ f(x) \to$ ______________

as $x \to \infty,\ f(x) \to$ ______________

Graph f(x) from the previous page with a light, dashed curve, then plot g(x) below with a solid curve.

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

x	g(x) as fraction	g(x) as decimal approximation
-10		
-9		
-8		
-7		
-6		
-5		
-4		
-3		
-2		
-1		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



What are the similarities between f(x) and g(x)? Be specific.

What is different? What *transformation* occurred?

Equation of the asymptote:

State the DOMAIN of the function g(x) = 2^{x+3} in interval notation:

State the RANGE of the function g(x) = 2^{x+3} in interval notation:

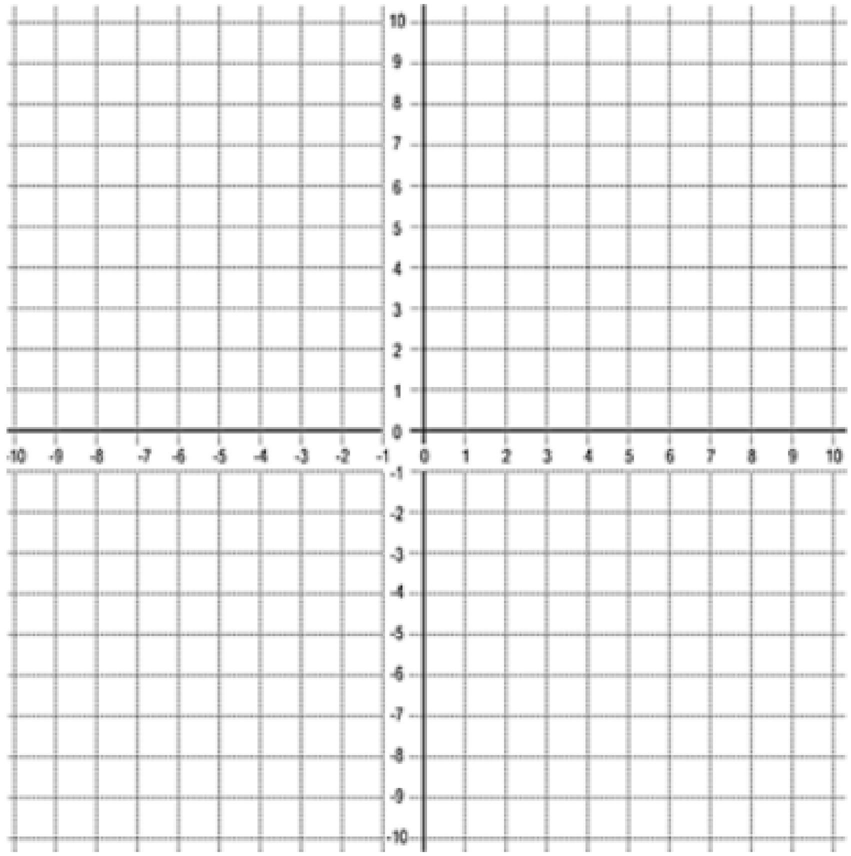
State the end behavior of the function g(x) = 2^{x+3}: as $x \to -\infty,\ g(x) \to$ ______________

as $x \to \infty,\ g(x) \to$ ______________

Graph f(x) from the first page with a light, dashed curve, then plot k(x) below with a solid curve.

3. $k(x) = -3(2)^x$

x	k(x) as fraction	k(x) as decimal approximation
-10		
-9		
-8		
-7		
-6		
-5		
-4		
-3		
-2		
-1		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



What are the similarities between f(x) and k(x)? Be specific.

What is different? What *transformation* occurred?

Equation of the asymptote:

State the DOMAIN of the function k(x) = 3(2)^x in interval notation:

State the RANGE of the function k(x) = 3(2)^x in interval notation:

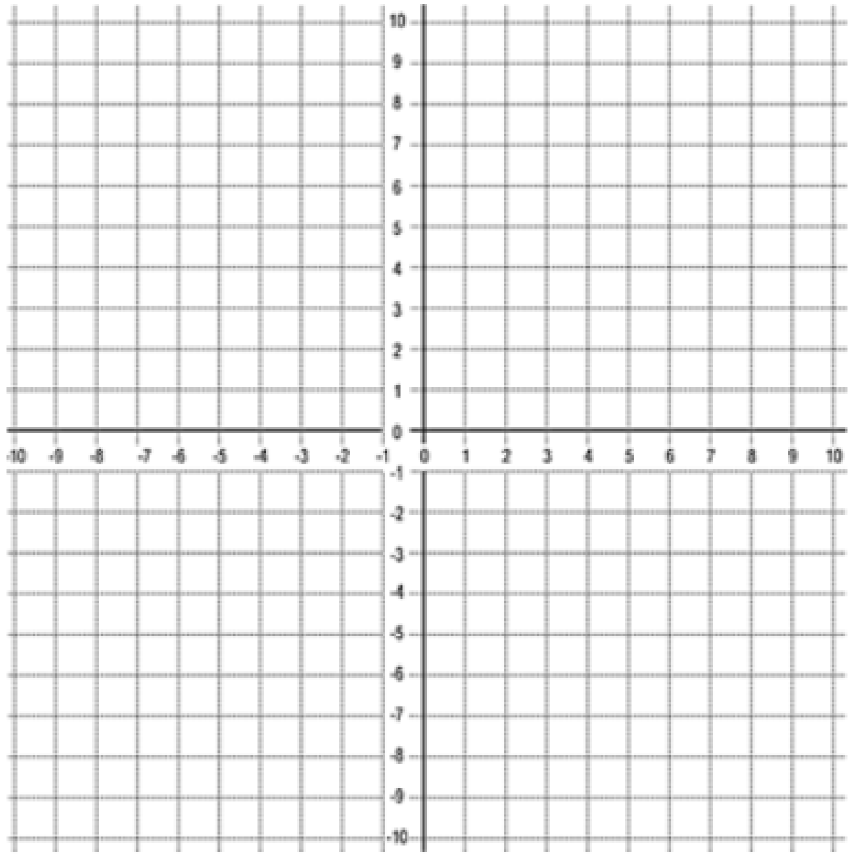
State the end behavior of the function k(x) = 3(2)^x : as $x \to -\infty,\ k(x) \to$ ______________

as $x \to \infty,\ k(x) \to$ ______________

Graph f(x) from the first page with a light, dashed curve, then plot h(x) below with a solid curve.

4. $h(x) = 2^x + 2$

x	h(x) as fraction	h(x) as decimal approximation
-10		
-9		
-8		
-7		
-6		
-5		
-4		
-3		
-2		
-1		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



What are the similarities between f(x) and h(x)? Be specific.

What is different? What *transformation* occurred?

Equation of the asymptote:

State the DOMAIN of the function h(x) = 2^x + 2 in interval notation:

State the RANGE of the function h(x) = 2^x + 2 in interval notation:

State the end behavior of the function h(x) = 2^x + 2: as $x \to -\infty,\ h(x) \to$ _____________

as $x \to \infty,\ h(x) \to$ _____________

Predict the transformations that that will be applied to the *parent function.* List them in the order that they will occur (think PEMDAS!!!)

5. $y = 4(2)^{x+5} - 3$ **Transformations:** ______________________________

____

____

6. $y = -(2)^{x-4} - 6$ **Transformations:** ______________________________

____

____

7. $y = \frac{1}{2}(2)^{x+1} + 4$ **Transformations:** ______________________________

____

____

8. $y = 2^{x+3} - 7$ **Transformations:** ______________________________

____

____

Plot points and graph f(x) = 2^x lightly with a dashed curve. Then use the transformations to plot $t(x) = 3(2)^{x-1} - 8$

$t(x) = 3(2)^{x-1} - 8$

Transformations:

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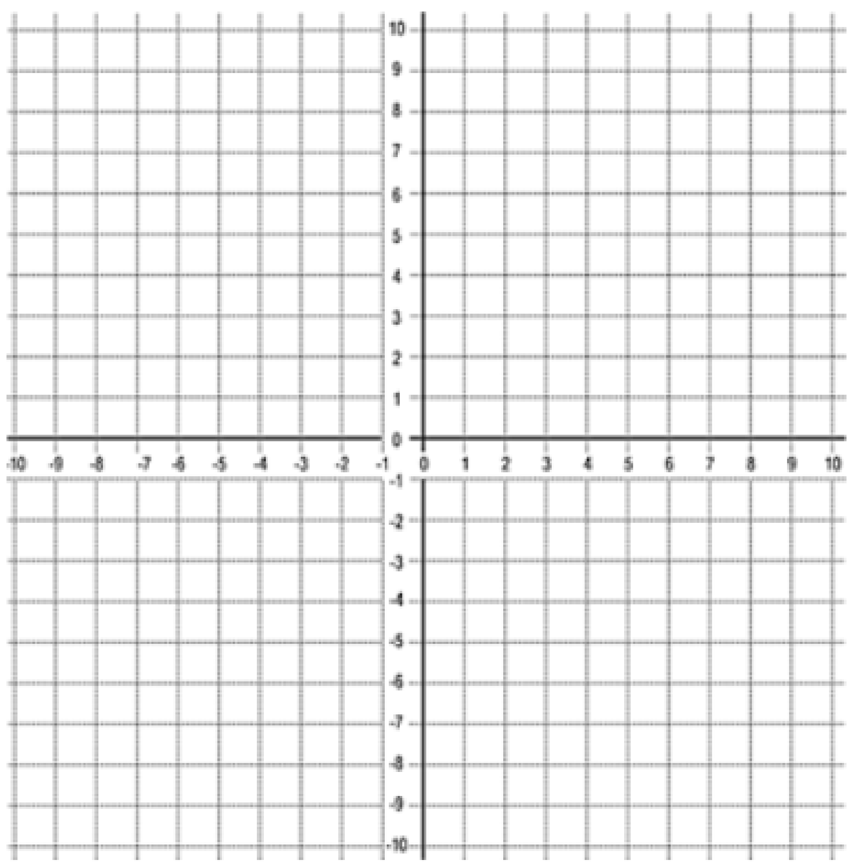

9. Simplify/evaluate without a calculator.

a) $(2)^1$ **b)** $(2)^{-1}$ **c)** $\left(\frac{1}{2}\right)^1$ **d)** $\left(\frac{1}{2}\right)^{-1}$

e) $(2)^3$ **f)** $(2)^{-3}$ **g)** $\left(\frac{1}{2}\right)^3$ **h)** $\left(\frac{1}{2}\right)^{-3}$

i) a^4 **j)** a^{-4} **k)** $\left(\frac{a}{b}\right)^4$ **l)** $\left(\frac{a}{b}\right)^{-4}$

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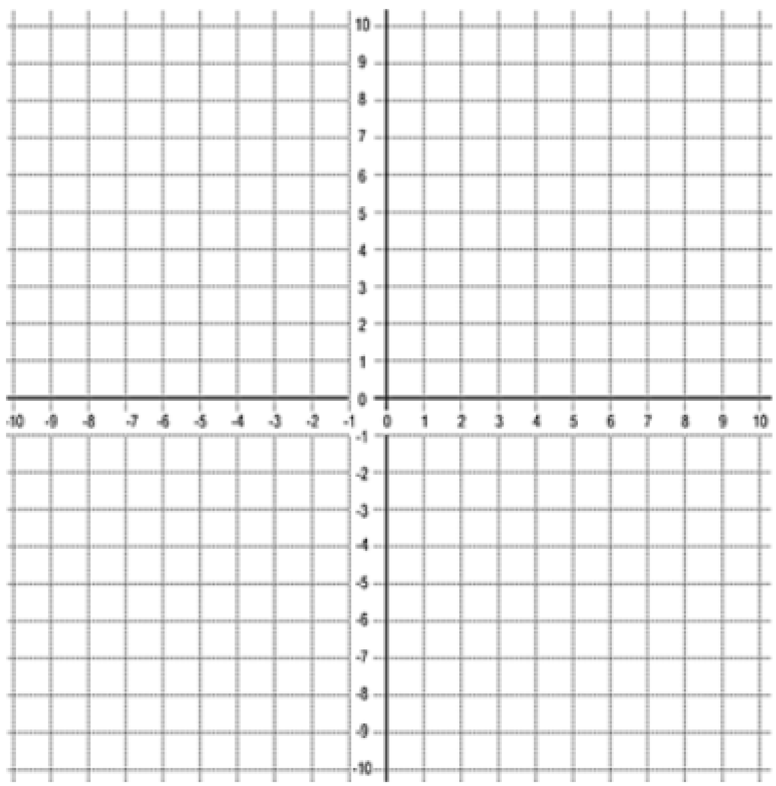
10. $w(x)=\left(\frac{1}{2}\right)^x$

x	w(x) as fraction	w(x) as decimal approximation
-6		
-5		
-4		
-3		
-2		
-1		
0		
1		
2		
3		
4		
5		
6		



Will this graph ever touch the x-axis? Why or why not?

If not, is there an asymptote? What would its equation be?

State the DOMAIN of the function f(x) = (1/2)^x in interval notation:

State the RANGE of the function f(x) = (1/2)^x in interval notation:

State the end behavior of the function f(x) = (1/2)^x: as $x \to -\infty,\ f(x) \to$ ______________

as $x \to \infty,\ f(x) \to$ ______________