Howdy!!!!

Mr. Watson

Algebra

Paper

Test Average:

This Year

2nd Block: 78% and 76%

4th Block: 80% and 67%

Last Year

2nd Block: 82% and 77%

4th Block: 80% and 75%

Convert to the other form:

$$y = x^2 - 10x + 17$$

$x = \frac{-b}{2a} = \frac{10}{2(1)} = \frac{10}{2} = \boxed{5}$

$y = \boxed{-8}$

$y = 1(x-5)^2 - 8$

$$f(x) = -3\boxed{(x+4)^2}$$

	x	4
x	x^2	$4x$
4	$4x$	16

$-3(x^2 + 8x + 16)$

$-3x^2 - 24x - 48$

Convert to the other form:

$$f(x) = 2(x-8)^2 - 16$$

	x	-8
x	x^2	$-8x$
-8	$-8x$	64

$2(x^2 - 16x + 64)$

$2x^2 - 32x + 112$

$$y = 2x^2 - 4x + 10$$

$\frac{-b}{2a}$ $\frac{4}{2(2)} = \frac{4}{4} = 1, 8$

$y = 2(x-1)^2 + 8$

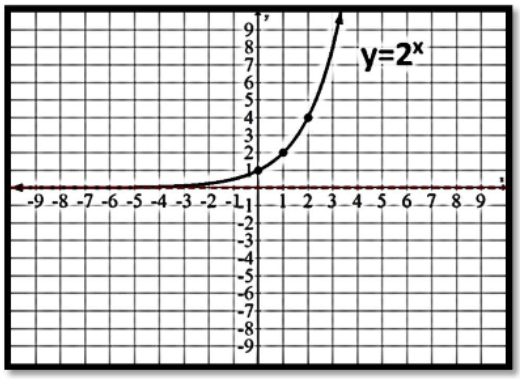
Power of 10

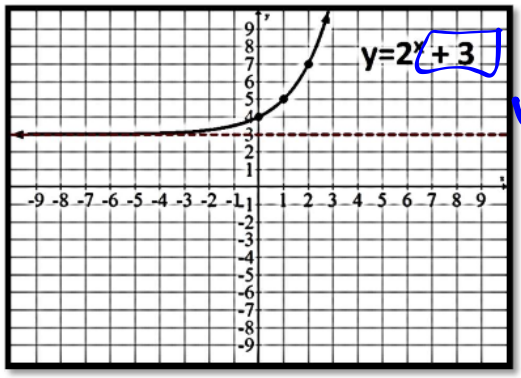
Transformations of Exponential Functions Name:_____ Date:_____

x is in the exponent

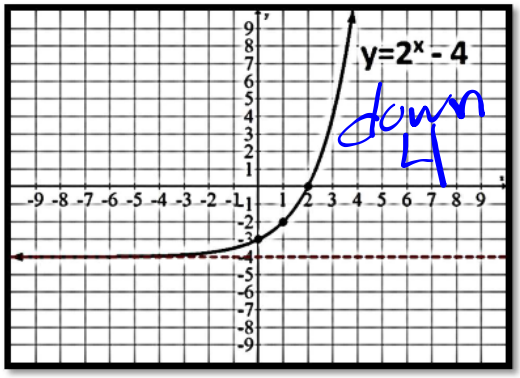
Now that we have explored EXPONENTIAL functions we are going to manipulate the equation to show different transformations. These transformations have specific rules that need to be followed in order to correctly write the equation of the transformed functions. See if you can follow the patterns below, to generate the rule.

PART 1:

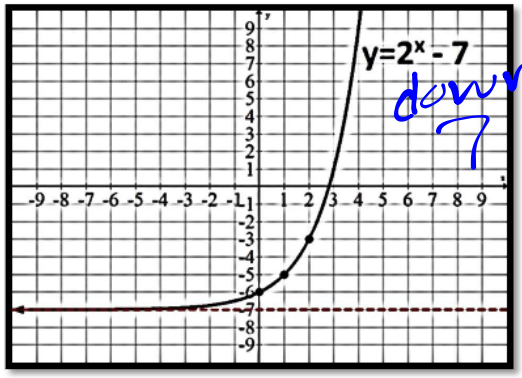




up 3



down 4



down 7

Looking at the graphs can you describe what happens when you see a "+"?

up

Looking at the graphs can you describe what happens when you see a "-"?

down

Write a rule for a transformation that has a shift of "+ k": $y = b^x + k$

Describe the transformations for the functions below:

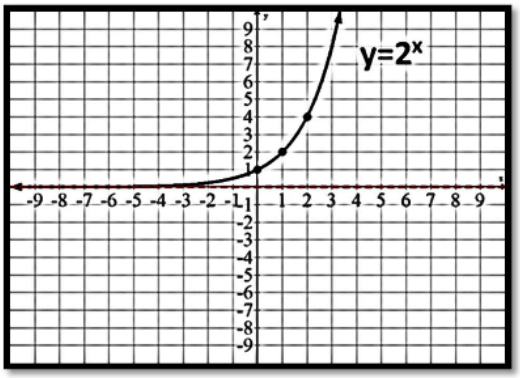
a. $y = 2^x + 5$ up 5

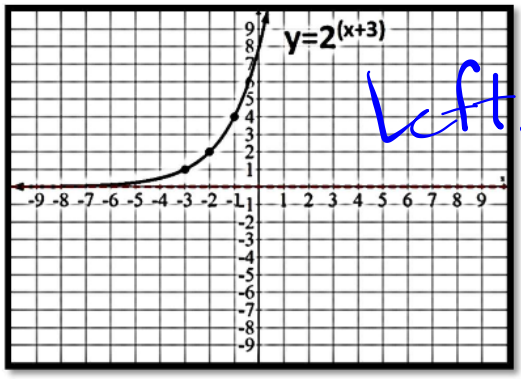
b. $y = 2^x - 9$ down 9

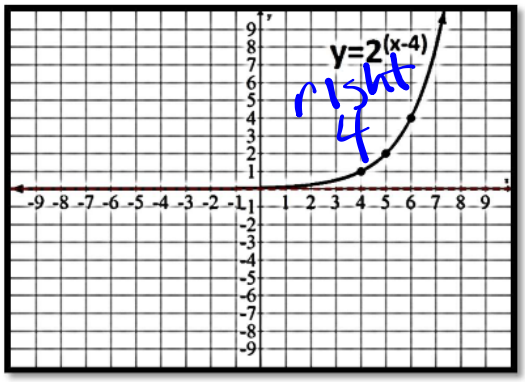
c. $y = 3^x - 1$ down 1

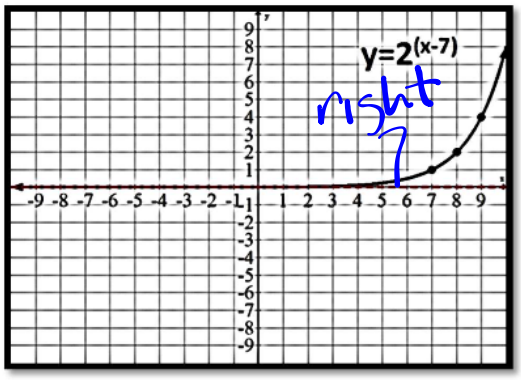
d. $y = 4^x + 17$ up 17

PART 2:









Looking at the graphs can you describe what happens when you see a "+"?

Left

Looking at the graphs can you describe what happens when you see a "-"?

right

Write a rule for a transformation that has a shift of "- h, and + k":

$y = b^{(x-h)} + k$ $y = b^{x-h} + k$

Describe the transformations for the functions below:

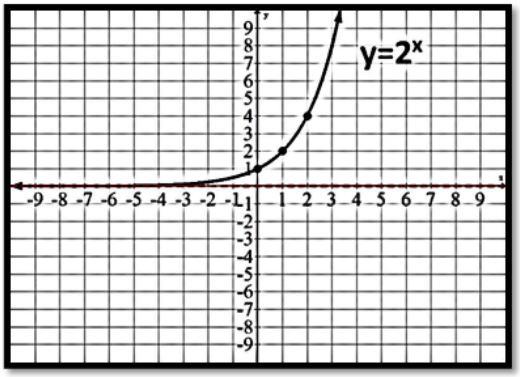
a. $y = 2^{x+9}$ left 9

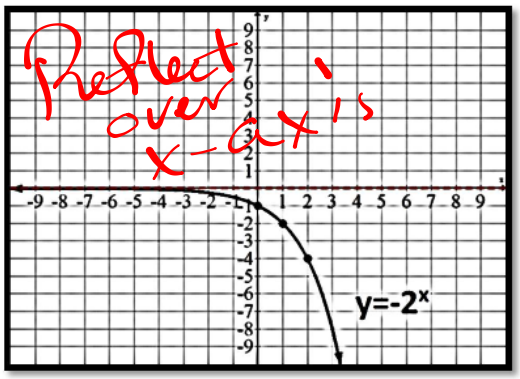
b. $y = 2^{x-8}$ right 8

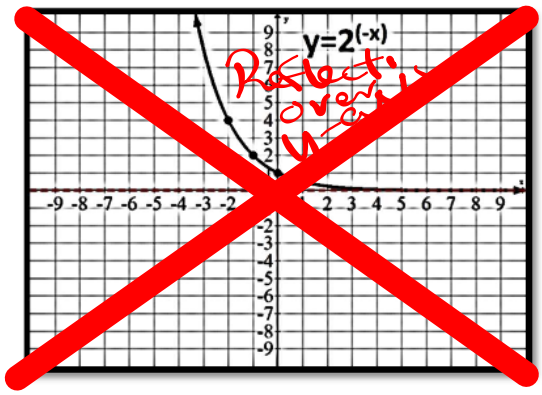
c. $y = 3^{x+12}$ left 12

d. $y = 4^{x-14}$ right 14

PART 3:







Looking at the graphs can you describe what happens when you see a "-" in front of the parent function?

Reflect over the x-axis

Looking at the graphs can you describe what happens when you see a "-" in the exponent of a parent function?

Reflect over the y-axis

Describe the transformations for the functions below:

a. $y = -7^x$

Reflect over x-axis

b. $y = 8^{-x}$

c. $y = 3^x$

Nothing

d. $y = -4^x$

Reflect over x-axis

Lets try some harder transformations:

a. $y = -7^{x+2}$

Reflect x
left 2

b. $y = 8^{-x} + 3$

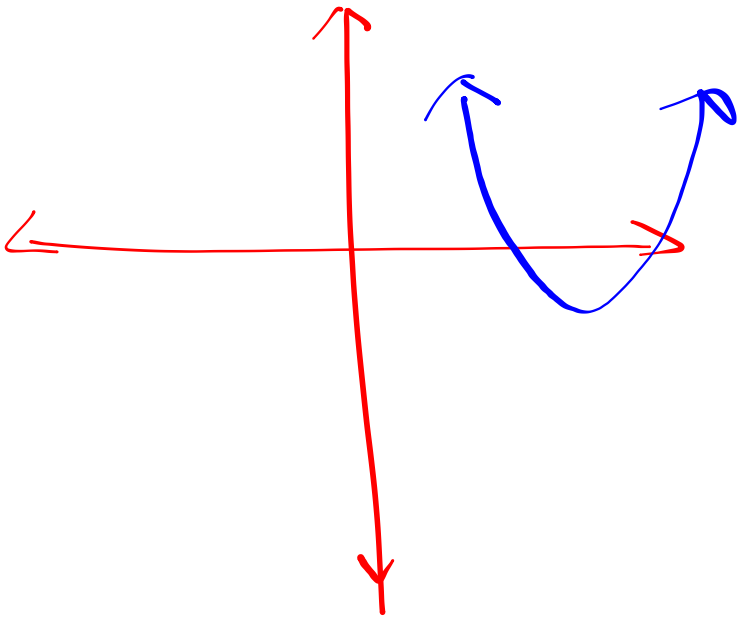
up 3

c. $y = -3^x + 7$

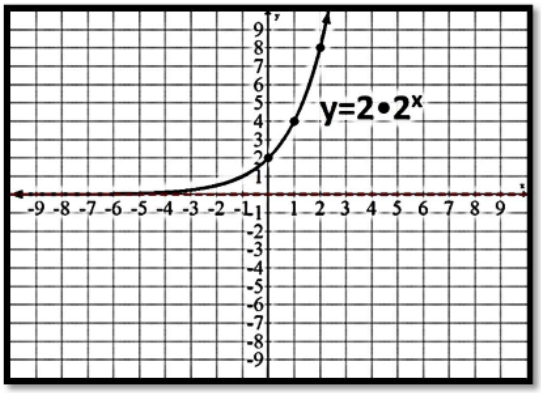
Reflect x
up 7

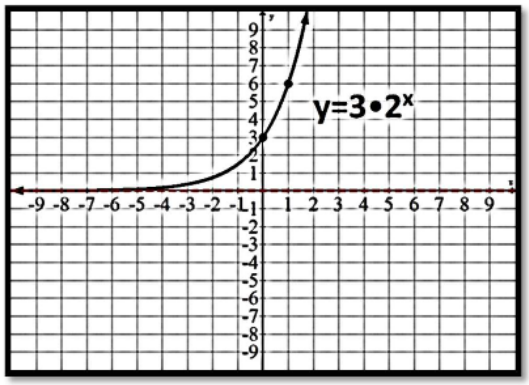
d. $y = -4^{x-5} - 6$

Reflect x
Down 6
Right 5



PART 4:





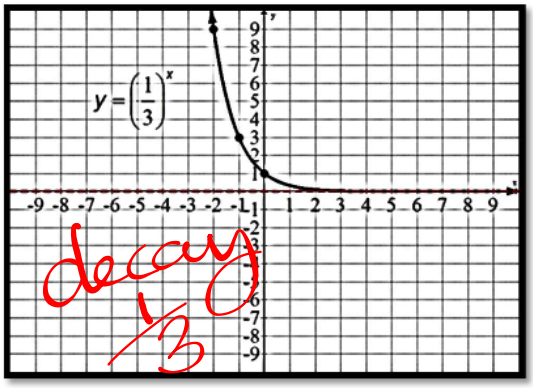
Looking at the graphs can you describe what happens when you see a "#" in front of the parent function?

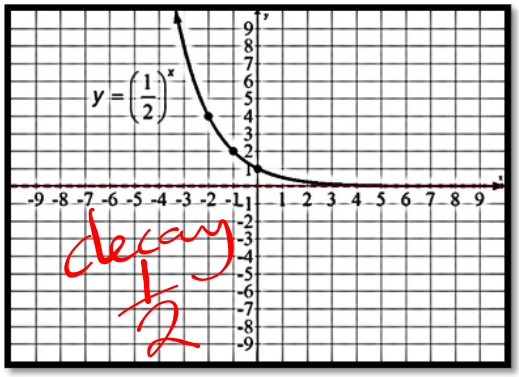
Stretch or Shrink
bigger than 1 b/w 0 and 1

Write a rule for a transformation that has a shift of "a, -h, and a+k":

$y = a \cdot b^{(x-h)} + K$

PART 5:





Looking at the graphs can you describe what happens when you see a "fraction" as the parent function?

Growth or Decay
Bigger then 1 b/w 0 and 1

Describe the transformations for the functions below:

a. $y = 4 \bullet 7^x - 2$
Stretch 4
Growth 7
Down 2

b. $y = \left(\frac{1}{5}\right)^{x-6}$
Decay $\frac{1}{5}$
Right 6

c. $y = -9 \bullet 6^x$
Reflect x
Stretch 9
Growth 6

d. $y = -\left(\frac{1}{2}\right)^{x+4}$
Reflect x
Decay $\frac{1}{2}$
left 4

e. $y = -2 \bullet 7^x$
Reflect x
Stretch 2
Growth 7

f. $y = 7^{x+4} - 9$
Growth 7
left 4
down 9

g. $y = -6^{x-1}$
Reflect
Growth 6
Right 1

h. $y = 4 \bullet \left(\frac{1}{2}\right)^x + 10$
Stretch 4
Decay $\frac{1}{2}$
up 10

All the transformations in one!

$$y = -ab^{-x-h} + k$$

Reflect x-axis

left right

Stretch Shrink

growth decay

up down

Practice Problems!

Coordinate Algebra Unit 3: Expon

Day 3: Transforming 0:00:00 **:tice**

Directions: Describe the transformations from the parent function to the transformed function:

1. $f(x) = 2^x \rightarrow f(x) = 2^{x-2}$

Right 2

2. $y = \frac{1}{2}(8)^x \rightarrow y = \frac{1}{2}(8)^x + 6$

up 6

3. $y = 4(0.6)^x \rightarrow y = 4(0.6)^x - 3$

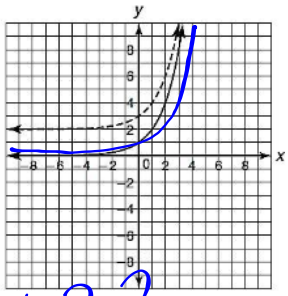
Down 3

4. $f(x) = 4^x \rightarrow f(x) = 4^{x+3} - 8$

left 3
down 8

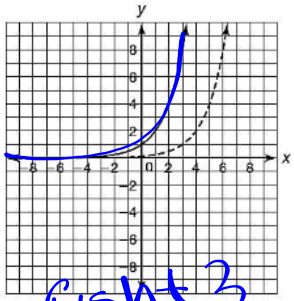
Directions: Using the graphs of f(x) and g(x), described the transformations from f(x) to g(x). F(x) is the solid line and g(x) is the dotted line.

5.



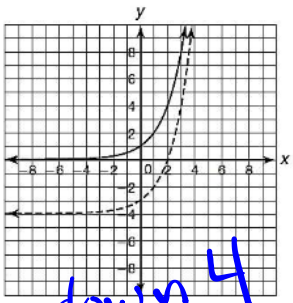
up 2

6.



right 3

7.



down 4

Directions: Using the function $g(x) = 5^x$, create a new function h(x) given the following transformations:

8. down 3 units

$5^x - 3$

9. right 8 units

$5^{(x-8)}$

10. up 4 units and left 2 units

$5^{(x+2)} + 4$

Directions: Decide whether each of the following is an example of exponential growth (increase) or decay (decrease). ~~Then state the y intercept.~~

11. $y = 5^x$

Growth
5

12. $y = \left(\frac{1}{2}\right)^x$

Decay
$\frac{1}{2}$

13. $y = -3^x$

Growth
3

14. $y = 2\left(\frac{4}{3}\right)^{-x}$

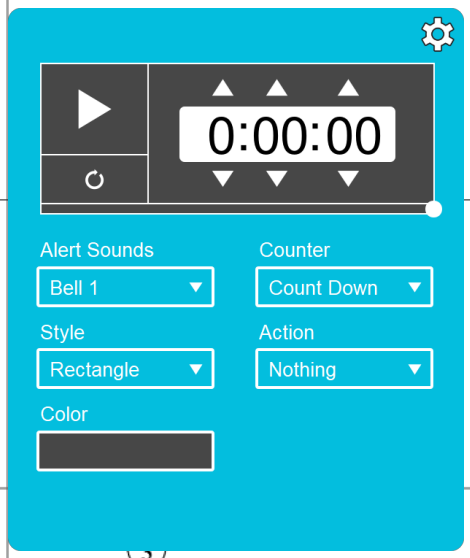
Growth
$\frac{4}{3}$

CCGPS Coordinate Algebra Name: _____

Transformations & Characteristics of Exponential Function Date: _____ Block: _____

Part 1: Describe the transformations for each of the functions below:

1.) $f(x)=2^{-x}$	2.) $b(x)=-(2)(2)^{x+1}-2$
3.) $k(x)=-\left(\frac{1}{2}\right)^{x}+3$	
5.) $g(x)=2^{x+5}-1$	
7.) $t(x)=\left(\frac{1}{2}\right)(3)^{x-1}+4$	8.) $h(x)=-2^{x-3}$
~~9.) $s(x)=-(2)^{2x}$~~	10.) $s(x)=-(3)(2)^{x+2}+4$



Graphing!!!

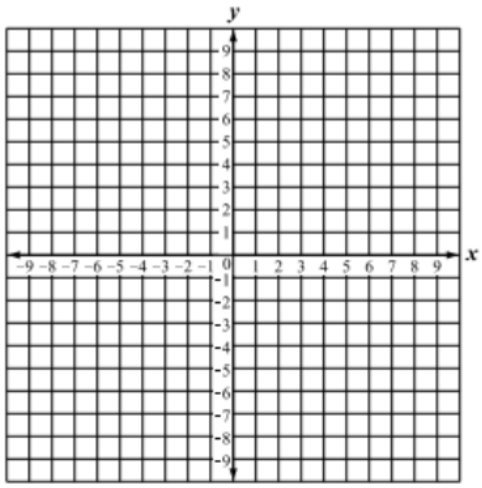
Coordinate Algebra Support

Name:_____
Date:_____ Block:_____

Transformations of Exponential Functions

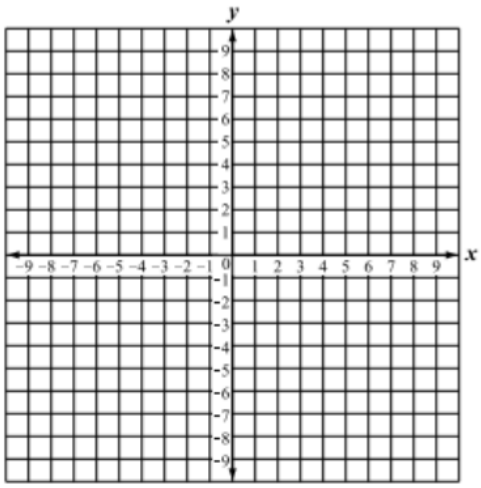
Graph the following functions.

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



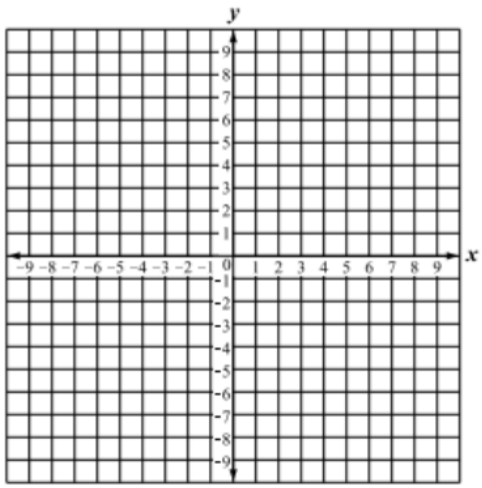
Asymptote:_____

2. $m(x) = 2^x + 3$



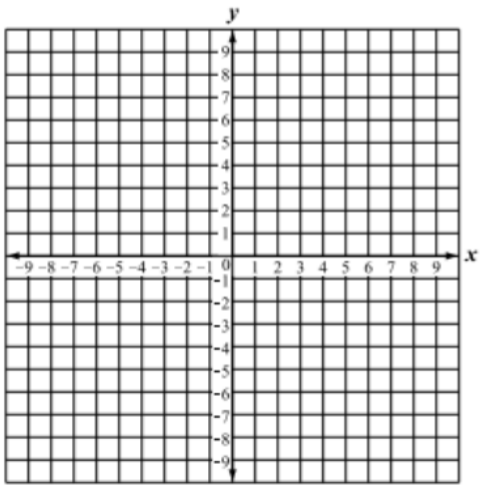
Asymptote:_____

3. $g(x) = 2^{x-4}$



Asymptote:_____

4. $p(x) = 2^{x+1} - 6$



Asymptote:_____

Write the equation of the function given the parent function $f(x) = 3^x$ and the following transformations.

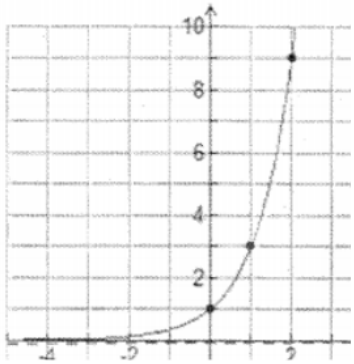
5. Shifted up 5.

6. Shifted left 7.

7. Shifted right 4 and down 8.

Determine the equation for the exponential function.

8.



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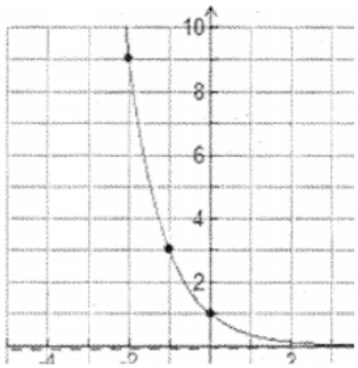
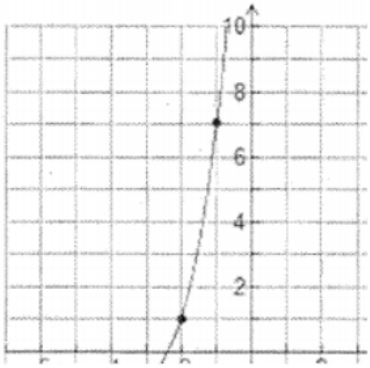
10.