*AAT

Name: Key

Chapter 5: Exploration- Bacterial Growth (IC)

Date: _____ Period: _____

Science class, you are studying bacterial growth. You begin by placing a single bacterium in a petri dish. The number of bacterial triples every day.

1. Complete the table of values below.

Time	Number of bacteria
Days	Bacteria
0	1
1	3
2	9
3	27
4	81
5	243
6	729
7	2187
8	6561
9	19,683
10	59,049

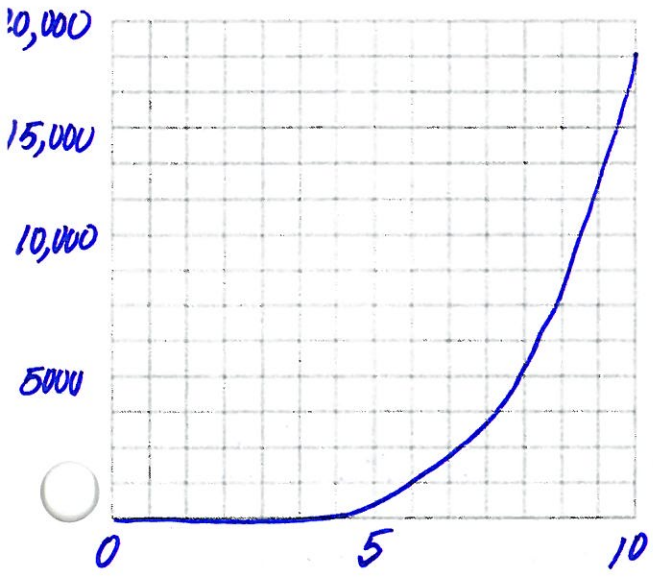
2. Write an equation to model the number of bacteria over time.

$y = 3^x$

x = time (days)

y = # of bacteria

3. Graph the function below.



4. What is the y-intercept of the graph? Describe what this means in terms of the problem situation. Is this realistic in this problem situation? y-int (0, 1)

We started 1 bacterium

Yes; realistic

5. What is the x-intercept of the graph? Describe what this means in terms of the problem situation. Is this realistic in this problem situation? No x-intercept

There will never be 0 bacteria

No; Not realistic b/c b4 we added 1 bacterium, there was zero.

*AAT

Name: _____

Chapter 5: Exploration- Logs, Functions & Inverses (IC)

Date: _____ Period: _____

Answer the following questions for the function $f(x) = 3^x$.

1. Determine an equation for the inverse of f(x) using logs.

$y = 3^x$

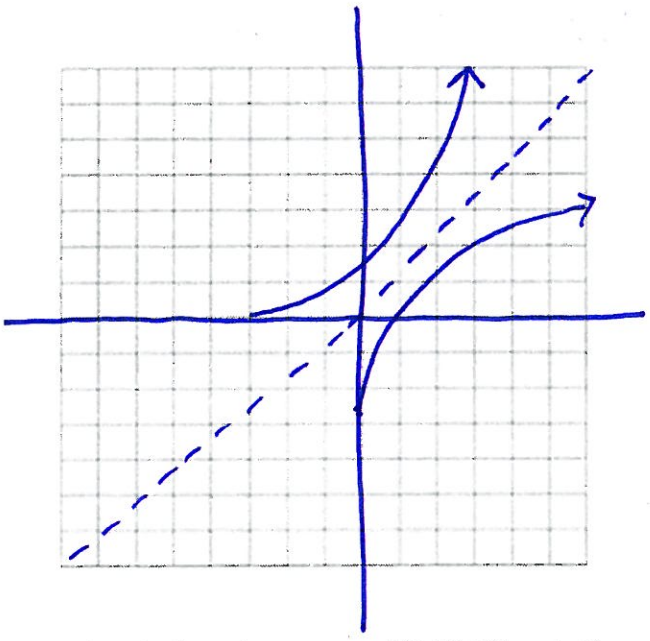
$x = 3^y$

$y = \log_3 x$ or $f^{-1}(x) = \log_3 x$

2. Perform a change-of-base conversion to allow you to enter the inverse function into your calculator.

$$f^{-1}(x) = \frac{\log x}{\log 3}$$

3. Create a graph of f(x), $f^{-1}(x)$, and the line y = x.



4. What is the y-intercept of f(x)? What is the x-intercept of $f^{-1}(x)$?

y-intercept of $f(x) = (0,1)$

x-intercept of $f^{-1}(x) = (1,0)$

5. Is this consistent with what you know about inverses? Explain.

yes; the x & y values between a function & its inverse switch, so if pt. (0,1) is on f(x), then pt. (1,0) should be on $f^{-1}(x)$.