**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Day 00 Intro to Exponential Growth

**Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_Block\_\_\_\_**

**Mitosis is a process of cell duplication in which one cell divides into two. The eschericia coli is one of the fastest growing bacteria. It can reproduce itself in 15 minutes. If you begin with one eschericia coli cell, find the number of cells for each 15-minute interval in the chart and answer the questions below**.

1. Fill in the rest of the chart to recognize the cell’s pattern.

|  |  |  |
| --- | --- | --- |
| 15-minute  **Intervals** | **Total # of cells** | Pattern |
| 0 | 1 |  |
| 1 | 2 |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |

1. Using your TI-83, enter the 15-minute intervals into L1 and the

corresponding total number of cells into L2.

1. Make a scatter plot of the data.
2. Find the regression equation. *Hint: It is not a linear or quadratic function!*

f(x) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How many cells will there be in one hour? \_\_\_\_\_\_\_\_
2. How many cells will there be in 24 hours? \_\_\_\_\_\_\_\_

**Enter the following functions into your calculator and write your conclusions.**

1. y = 3x and y = 2x As x increases, y \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. y = .5x and y = .2x As x increases, y \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. y = -2x As x increases, y \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. y = 1x What happened?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Domain:\_\_\_\_­\_\_\_\_\_\_\_\_\_\_\_\_ Domain:\_\_\_\_­\_\_\_\_\_\_\_\_\_\_\_\_ Domain:\_\_\_\_­\_\_\_\_\_\_\_\_\_\_\_\_

Range:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**EXPONENTIAL GROWTH DISCOVERY:**

1. Graph **y = 2x** on the calculator as y1.

* What is the domain?\_\_\_\_\_\_\_ the range? \_\_\_\_\_\_\_ the y-intercept?\_\_\_\_\_\_\_\_

2. Graph y2 = 2x and y3 = (3)2x. Compare these functions to y = 2x.

* How did the domain, range, and y-intercept change?

Y2: (domain: \_\_\_\_\_\_\_\_\_\_\_\_\_, range: \_\_\_\_\_\_\_\_\_\_\_\_\_, y-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_)

Y3: (domain: \_\_\_\_\_\_\_\_\_\_\_\_\_, range: \_\_\_\_\_\_\_\_\_\_\_\_\_, y-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_)

* What part of the function do you think caused each change?

3. Graph y2 = 2x and y3 = (-5)2x . Compare these functions to y = 2x.

* How did the domain, range, and y-intercept change?

Y2: (domain: \_\_\_\_\_\_\_\_\_\_\_\_\_, range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_, y-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_)

Y3: (domain: \_\_\_\_\_\_\_\_\_\_\_\_\_, range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_, y-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_)

* What part of the function do you think caused each change?

1. Describe the effect of **a** on the graph of **y = (a)2x** when **a** is positive and when **a** is negative.
2. What part of the graph is affected when **a** is changed?

6. Explain how the graph of g(x) can be obtained from the graph of f(x).

A. f(x) = 5x B. f(x) = 10x C. f(x) = 4x

g(x) = 5x+2 - 3 g(x) = (2)10x + 1 g(x) = -4x-3 + 2

**EXPONENTIAL DECAY DISCOVERY:**

1.Graph  **** on the calculator as y1.

* What similarities are there to the graph of y = 2x ?
* What is the domain?\_\_\_\_\_\_\_\_\_\_\_ the range? \_\_\_\_\_\_\_\_\_\_\_ the y-intercept?\_\_\_\_\_\_\_\_\_\_\_
* Why do you think this is called “exponential decay?

2. Explain how the graph of g(x) can be obtained from the graph of f(x).

A. f(x) =  B. f(x) =  C. f(x) = 

g(x) =  g(x) = 2 + 1 g(x) = 