

Name

7.4 Write and Graph Exponential Growth Functions

Alg I

I can write and graph exponential growth models.

Exponential function: A function in the form of $y = ab^x$, $a \neq 0, b > 0, b \neq 1$. They are nonlinear functions.

Example: $y = 2 \cdot 3^x$

| | | | | | |
|---|---------------|---------------|---|---|----|
| x | -2 | -1 | 0 | 1 | 2 |
| y | $\frac{2}{9}$ | $\frac{2}{3}$ | 2 | 6 | 18 |

$\times 3$ $\times 3$ $\times 3$ $\times 3$

Example 1:

1)

| | | | | | |
|---|----|----|----|----|-----|
| x | -2 | -1 | 0 | 1 | 2 |
| y | 3 | 9 | 27 | 81 | 243 |

 = $y = a \cdot b^x$
 $a = 27$
 $b = 3$
 $y = 27 \cdot 3^x$

$\times 3$ $\times 3$ $\times 3$ $\times 3$

Example 2:

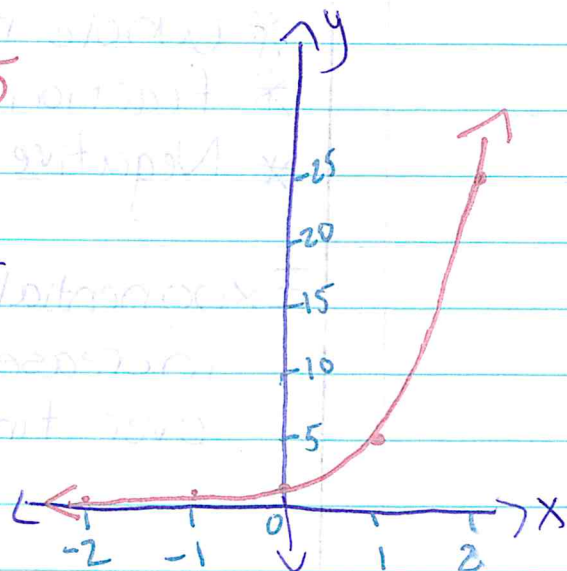
2) $y = 5^x$ $a = 1$ $b = 5$

| | | | | | |
|---|----------------|---------------|---|---|----|
| x | -2 | -1 | 0 | 1 | 2 |
| y | $\frac{1}{25}$ | $\frac{1}{5}$ | 1 | 5 | 25 |

$5^2 = \frac{1}{5^2} = \frac{1}{25}$ $5^2 = 25$

$5^{-1} = \frac{1}{5^1} = \frac{1}{5}$ $5^1 = 5$

$5^0 = 1$



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Exponential Growth Functions

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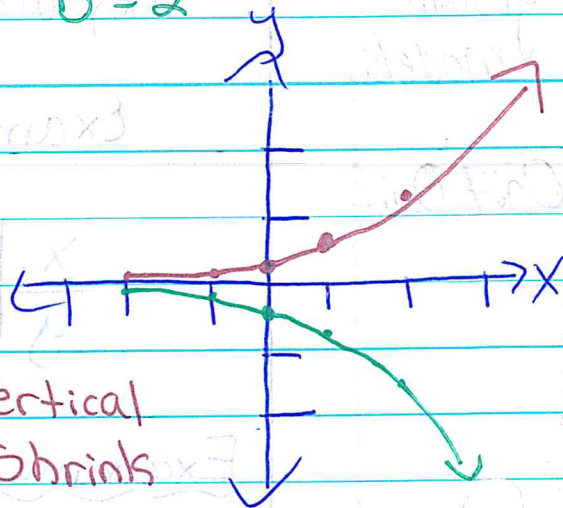
Example 3:

3) $y = \frac{1}{3} \cdot 2^x$ $a = \frac{1}{3}$ $b = 2$

Ch. 7
Quiz

| | | | | | |
|---|----------------|---------------|---------------|---------------|---------------|
| x | -2 | -1 | 0 | 1 | 2 |
| y | $\frac{1}{12}$ | $\frac{1}{6}$ | $\frac{1}{3}$ | $\frac{2}{3}$ | $\frac{4}{3}$ |

$\checkmark \times 2$ $\checkmark \times 2$ $\checkmark \times 2$ $\checkmark \times 2$



4) $y = -\frac{1}{3} \cdot 2^x$ $a = -\frac{1}{3}$ $b = 2$ vertical shrink with reflection

| | | | | | |
|---|-----------------|----------------|----------------|----------------|----------------|
| x | -2 | -1 | 0 | 1 | 2 |
| y | $-\frac{1}{12}$ | $-\frac{1}{6}$ | $-\frac{1}{3}$ | $-\frac{2}{3}$ | $-\frac{4}{3}$ |

- * Whole number : Vertical Stretch
- * fraction : Vertical Shrink
- * Negative number : Reflection across x-axis

Exponential Growth : When a number increases by the same percent over time.