

C.5 Day 3: Graphing Logarithmic Functions:

A logarithm is the inverse of exponential functions.
Remember that the **inverse** of a function is found by **switching** the domain and range. ($x \rightarrow y$ and $y \rightarrow x$)

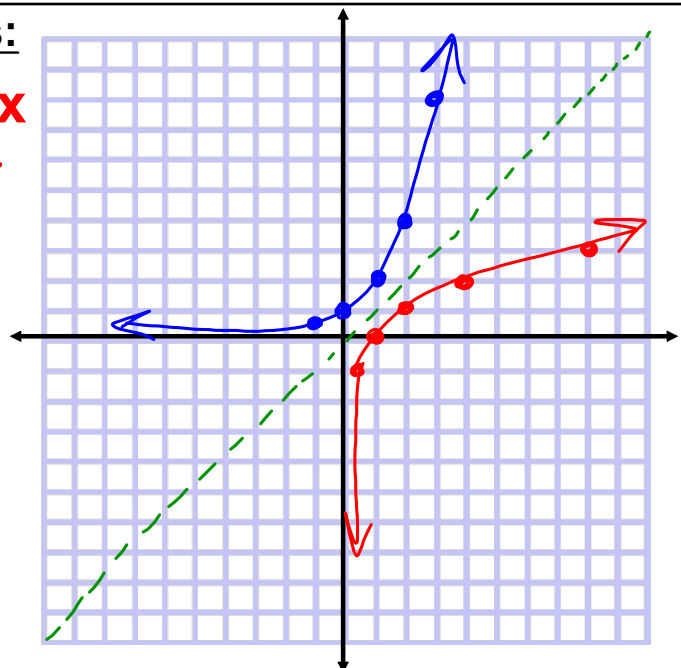
$$y = \log_2 x \text{ is the inverse of } y = 2^x$$

We can't write $x = 2^y$

Feb 17-3:13 PM

Compare/Contrast Graphs:

$$\underline{y = 2^x} \text{ v.s. } \underline{y = \log_2 x}$$



Apr 9-2:38 PM

Graphing Logarithmic Functions

$$y = a \log_b x$$

a - value

Stretch if greater than 1
Shrink if between 0 and 1
Reflect over x-axis if negative

b - value ("the base")

Logarithmic Growth or Decay
Growth if greater than 1
Decay if between 0 and 1

Feb 21-9:42 AM

Fill in the blanks...

$$y = \underline{4} \log_{\underline{2}} x$$

Growth or Decay?

Growth

Transformations?

Stretch by 4

Exponential Parent

$$y = 2^x$$

$$y = -\frac{1}{\underline{2}} \cdot \log_{\underline{3}} x$$

Growth or Decay?

Growth

Transformations?

reflect over x-axis,
shrink by 1/2

Exponential Parent

$$y = 3^x$$

$$y = \underline{2.5} \cdot \log_{\underline{\frac{1}{2}}} x$$

Growth or Decay?

Decay

Transformations?

stretch by 2.5

Exponential Parent

$$y = (\frac{1}{2})^x$$

Apr 10-8:21 AM

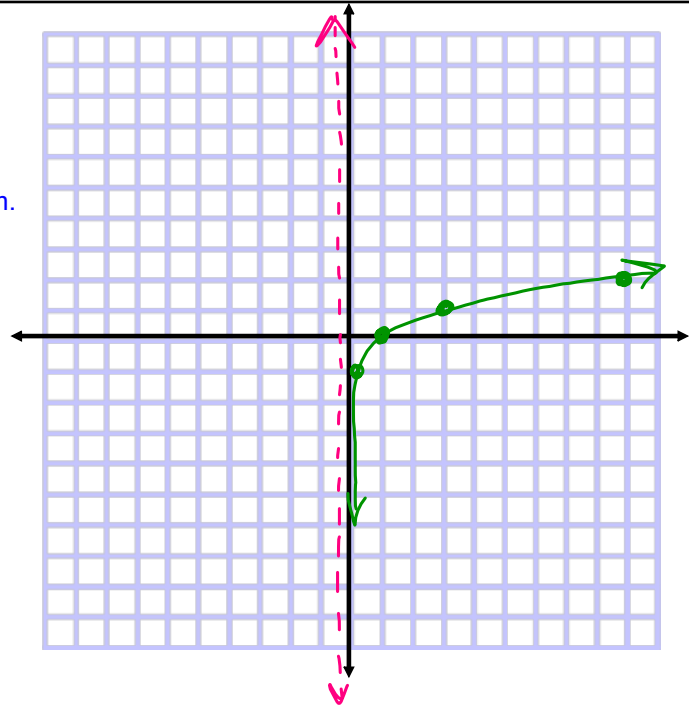
Ex1. Graph.

$$y = \log_3 x$$

1. Graph the exponential parent graph form.
2. Switch x and y coordinates. So you now have the log parent graph.
3. Apply stretch or compression.
4. Apply shifts.

$$1. y = 3^x$$

$$2. x \leftrightarrow y \quad y = \log_3 x$$



Feb 21-9:48 AM

Ex2. Graph.

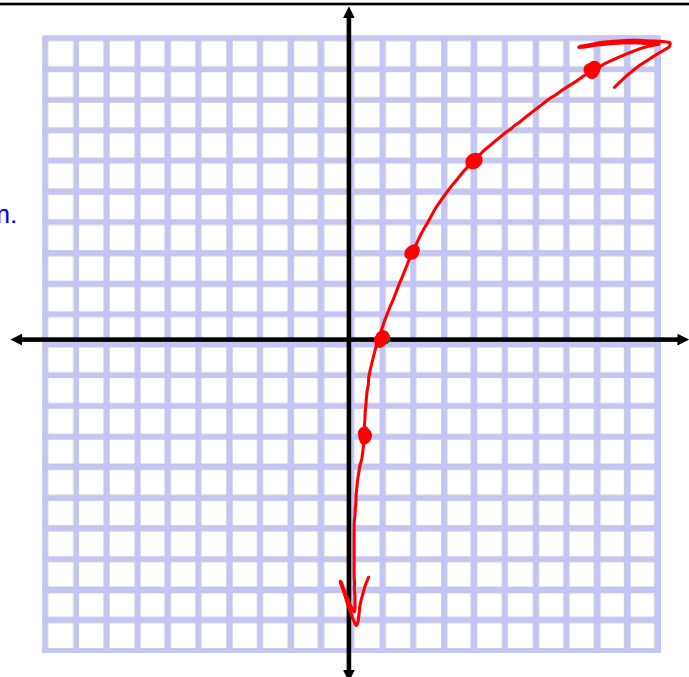
$$y = 3 \log_2 x$$

1. Graph the exponential parent graph form.
2. Switch x and y coordinates. So you now have the log parent graph.
3. Apply stretch or compression.
4. Apply shifts.

$$1. y = 2^x$$

$$2. y = \log_2 x$$

$$3. y = 3 \log_2 x$$



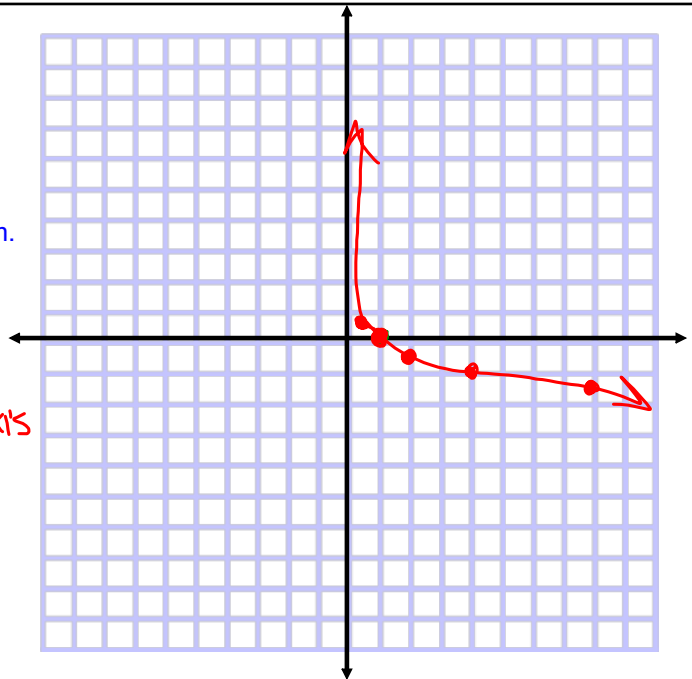
Feb 21-9:48 AM

Ex3. Graph.

$$y = -\frac{1}{2} \cdot \log_2 x$$

1. Graph the exponential parent graph form.
2. Switch x and y coordinates. So you now have the log parent graph.
3. Apply stretch or compression.
4. Apply shifts.

1. $y = 2^x$
 2. $y = \log_2 x$
 3. $-\frac{1}{2} \log_2 x$
- Reflect over x-axis and shrink by 1/2.*

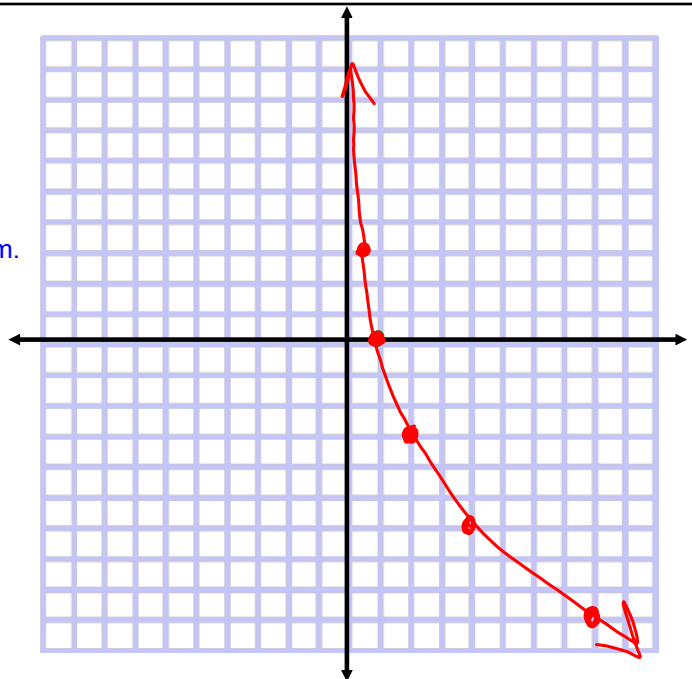


Feb 21-9:48 AM

Ex4. Graph.

$$y = 3 \cdot \log_{\frac{1}{2}} x$$

1. Graph the exponential parent graph form.
2. Switch x and y coordinates. So you now have the log parent graph.
3. Apply stretch or compression.
4. Apply shifts.



Feb 21-9:48 AM