

10.4 Graphing Exp/Logs

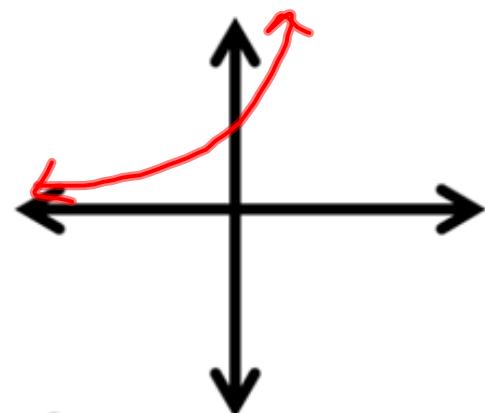
Warm-Up Friday

Log into your chromebook/go to google classroom. Your phone is not the ideal device today.

10.4 Graphing Exp/Logs

EQ: How do I graph exponential or log equations without a calculator?

Exponential Parent Function



Key Points

(0, 1)

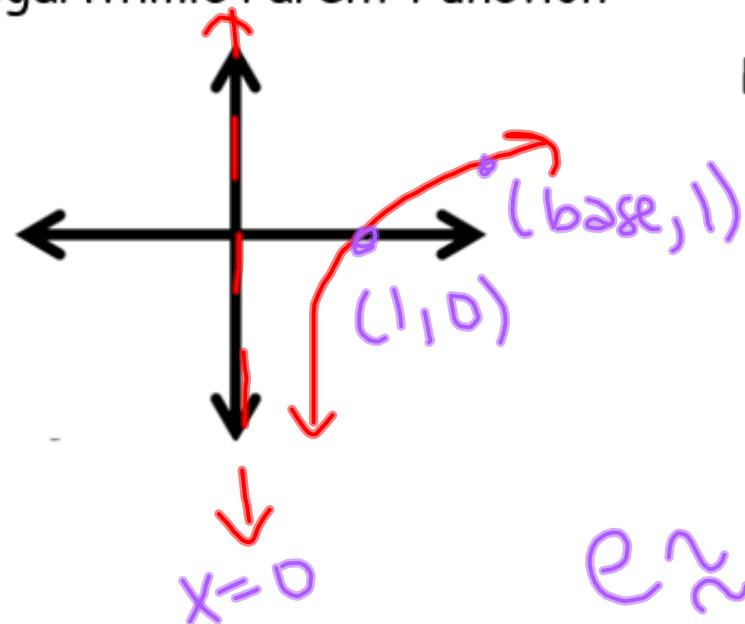
(1, base)

HA: $y = 0$

10.4 Graphing Exp/Logs

EQ: How do I graph exponential or log equations without a calculator?

Logarithmic Parent Function



Key Points

- $(1, 0)$
- $(\text{base}, 1)$
- VA: $x = 0$

$$e \approx 2.71$$

10.4 Graphing Exp/Logs

EQ: How do I graph exponential or log equations without a calculator?

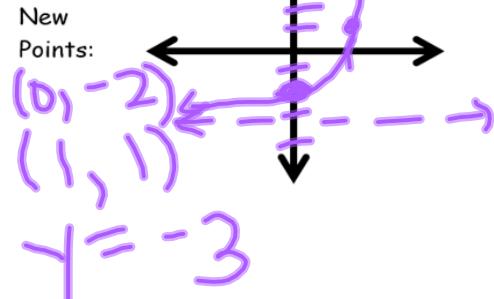
Equation

$$y = b^x + a \quad \text{or} \quad y = \log_b x + a$$

Transformation

vertical shift
+a ↑
-a ↓

Ex: $y = 4^x - 3$
Original Points:
 $(0, 1)$
 $(1, 4)$
 $y = 0$



Change to key points

x same
 $y + a$

Ex: $\log_5 x + 2$
Original points:
 $(1, 0)$
 $(\text{base}, 1)$
 $x \geq 0$

+2 y
New points:
 $(1, 2)$
 $(5, 3)$
 $x = 0$

10.4 Graphing Exp/Logs

EQ: How do I graph exponential or log equations without a calculator?

Equation

$$y = b^{x+a}$$

inside

$$y = \log_b(x+a)$$

Ex: $y = \log(x+4)$

Original points:

$$(1, 0)$$

$$(10, 1)$$

$$x=0$$

Transformation

horizontal shift
 $+a \leftarrow$
 $-a \rightarrow$

New points:

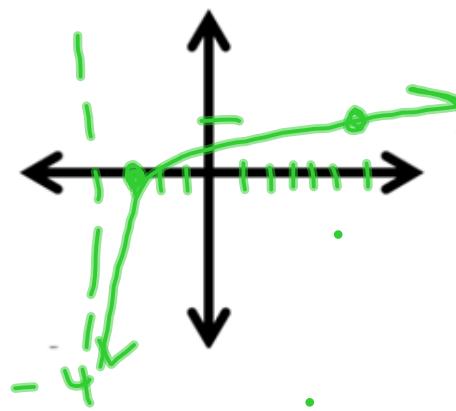
$$(-3, 0)$$

$$(6, 1)$$

$$x = -4$$

Change to key points

Y same
 subtract a
 from x-coord.



10.4 Graphing Exp/Logs

EQ: How do I graph exponential or log equations without a calculator?

To find the domain of a logarithmic function:

set argument (\sim) > 0 and solve

Ex: Find the domain of $y = \log_3(-2x+6) + 3$

$$-2x+6 > 0$$

$$\frac{-2x}{-2} > \frac{6}{-2}$$

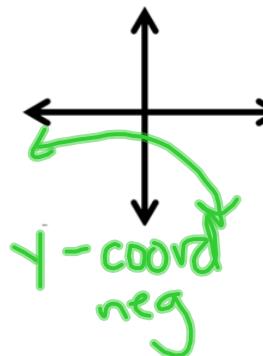
$$x < 3$$

$$(-\infty, 3)$$

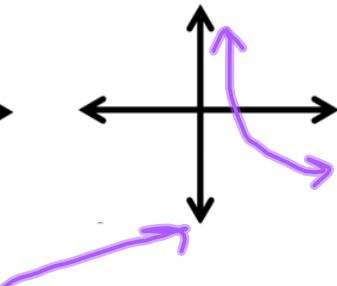
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EQ: How do I graph exponential or log equations without a calculator?

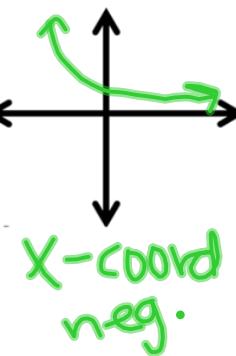
reflects over $y = -b^x$



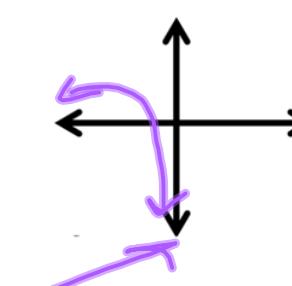
reflects over x
 $y = -\ln x$



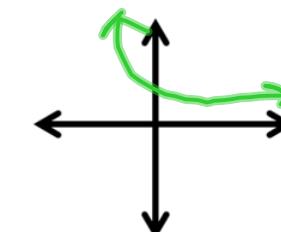
reflects over y
 $y = b^{-x}$



reflects over y
 $y = \ln(-x)$



$0 < b < 1$ reflect



$$\frac{1}{2} = 2^{-1}$$

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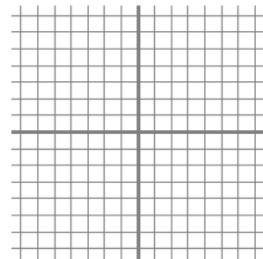
EQ: How do I graph exponential or log equations without a calculator?

~~Exit ticket on classroom~~

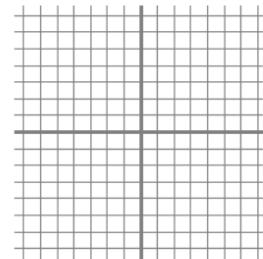
10.4 - Graphing Logarithmic and Exponential Functions Name: _____

Graph the following logarithmic and exponential transformations on the graphs provided. You should plot at least 2 points and any asymptotes. State the domain and range for each.

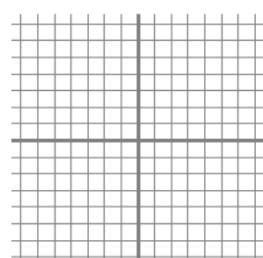
1. $y = 2^{x-1} + 3$



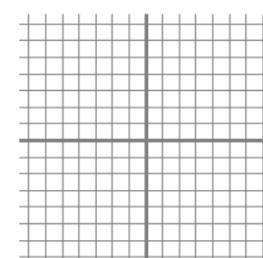
2. $y = e^{x+1}$



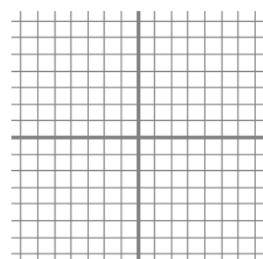
3. $y = -\ln x$



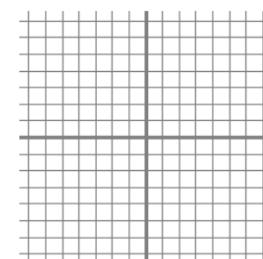
4. $y = \left(\frac{1}{2}\right)^x + 1$



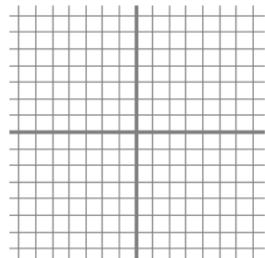
5. $y = \frac{1}{2} \log_4 x$



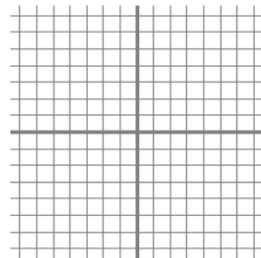
6. $y = \log_2(x - 3)$



7. $y = \log_2(x + 5) - 2$



8. $y = 3 \ln(x - 1) + 2$



9. $y = 3^{x+2} - 1$

