

10.4 Graphing Exp/Logs

Warm-Up Monday

Start the
front page
of the
notes!!

10.4 - Notes on Graphing Logarithmic and Exponential Functions

Activity – Graphing Exponential Functions

Graph $y = 2^x$, $y = e^x$, $y = 10^x$ in the same window on your calculator.

Fill out the following table:

	$y = 2^x$	$y = e^x$	$y = 10^x$
Domain			
Range			
x-intercept			
y-intercept			
Right end behavior $x \rightarrow \infty, f(x) \rightarrow$			
Left end behavior $x \rightarrow -\infty, f(x) \rightarrow$			
Asymptote			

Activity – Graphing Logarithmic Functions

Graph $y = \log_2 x$, $y = \ln x$, $y = \log x$ in the same window on your calculator.

Fill out the following table:

	$y = \log_2 x$	$y = \ln x$	$y = \log x$
Domain			
Range			
x-intercept			
y-intercept			
Right end behavior $x \rightarrow \infty, f(x) \rightarrow$			
Left end behavior $x \rightarrow -\infty, f(x) \rightarrow$			
Asymptote			

Activity – Graphing Both Kinds of Functions

Graph $y = e^x$, $y = \ln x$ in the same window on your calculator. If you add $y = x$, you can see that the original functions are _____ of each other in the line $y = x$. This makes the functions _____.

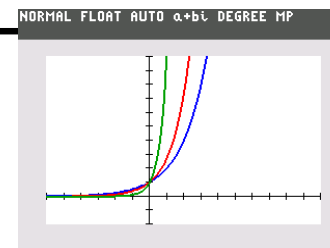
10.4 Graphing Exp/Logs

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

Activity – Graphing Exponential Functions

Graph $y = 2^x$, $y = e^x$, $y = 10^x$ in the same window on your calculator.

Fill out the following table:



	$y = 2^x$	$y = e^x$	$y = 10^x$
Domain	\mathbb{R}	\mathbb{R}	\mathbb{R}
Range	$y > 0$	$y > 0$	$y > 0$
x-intercept	none	none	none
y-intercept	$(0, 1)$	$(0, 1)$	$(0, 1)$
Right end behavior $x \rightarrow \infty, f(x) \rightarrow$	∞	∞	∞
Left end behavior $x \rightarrow -\infty, f(x) \rightarrow$	0	0	0
Asymptote	$y = 0$	$y = 0$	$y = 0$

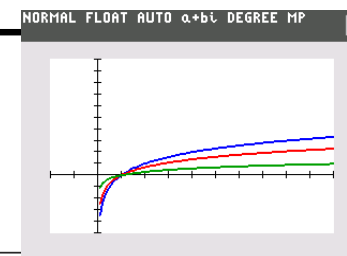
10.4 Graphing Exp/Logs

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

Activity – Graphing Logarithmic Functions

Graph $y = \log_2 x^*$, $y = \ln x$, $y = \log x$ in the same window on your calculator.

Fill out the following table:



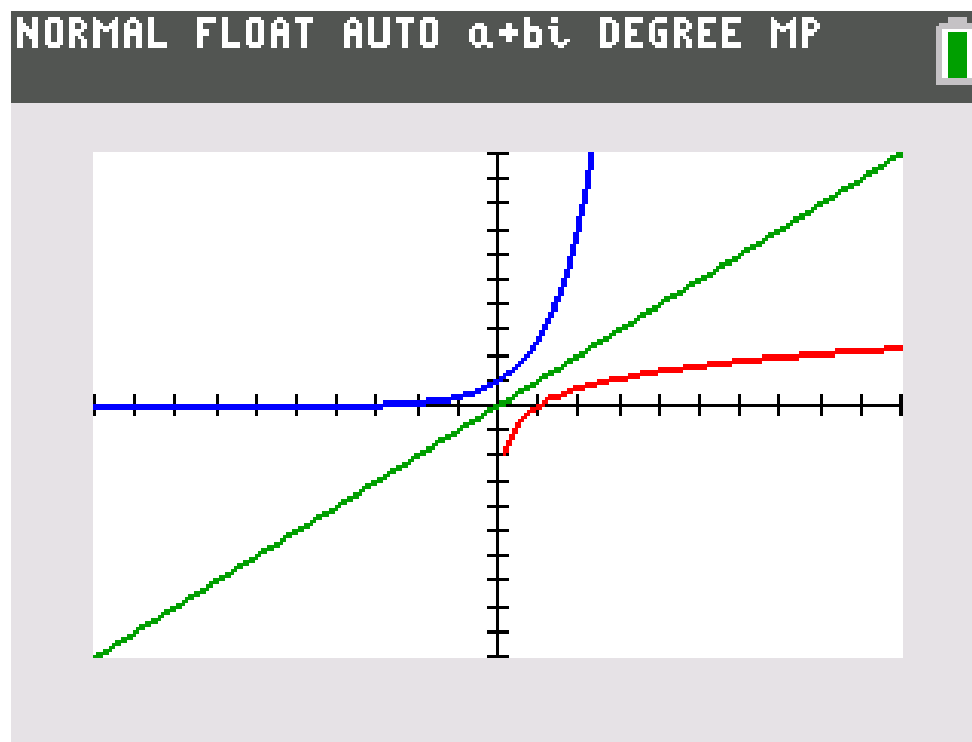
	$y = \log_2 x$	$y = \ln x$	$y = \log x$
Domain	$x > 0$	$x > 0$	$x > 0$
Range	\mathbb{R}	\mathbb{R}	\mathbb{R}
x-intercept	$(1, 0)$	$(1, 0)$	$(1, 0)$
y-intercept	none	none	none
Right end behavior $x \rightarrow \infty, f(x) \rightarrow$	∞	∞	∞
Left end behavior $x \rightarrow -\infty, f(x) \rightarrow$	N/A	N/A	N/A
Asymptote	$x = 0$	$x = 0$	$x = 0$

10.4 Graphing Exp/Logs

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

Activity – Graphing Both Kinds of Functions

Graph $y = e^x$, $y = \ln x$ in the same window on your calculator. If you add $y = x$, you can see that the original functions are reflections of each other in the line $y = x$. This makes the functions inverses.

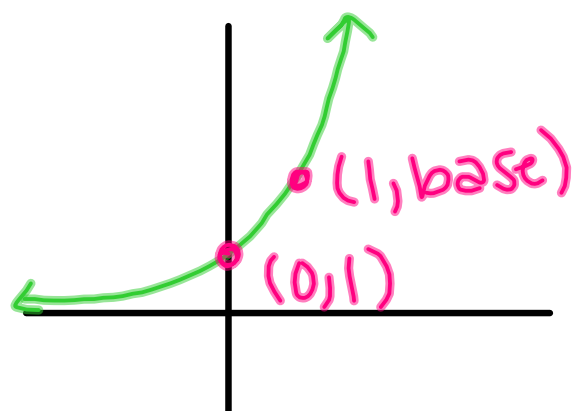


10.4 Graphing Exp/Logs

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

Summary:

Exponential: $y = a^x$

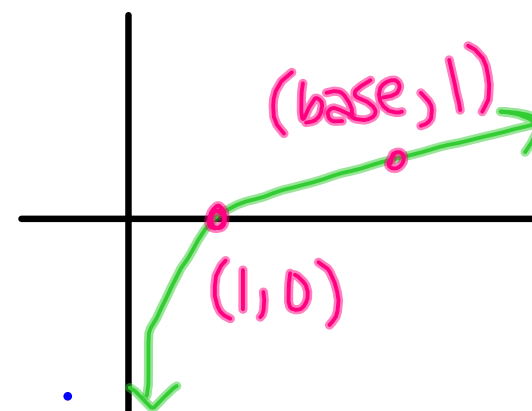


D: $(-\infty, \infty)$

R: $(0, \infty)$

Asymptote: $y = 0$

Logarithmic: $y = \log_b x$



D: $(0, \infty)$

R: $(-\infty, \infty)$

Asymptote: $x = 0$

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

Transformations: $y = Ca^{x+B} + A$ or $y = C \log_b(x+B) + A$

A determines vertical shift (up/down)
B determines horizontal shift (left/right)
C determines stretch/compression
and, if $C < 0$, reflection

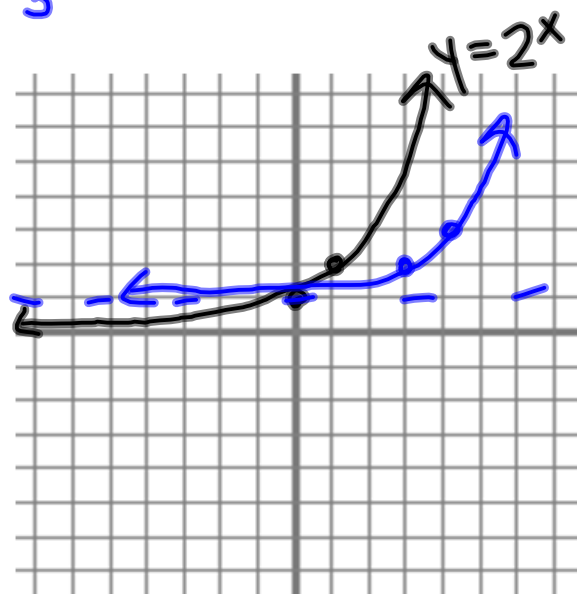
10.4 Graphing Exp/Logs

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

Example 1 - Sketch a graph of each of the following functions and state the transformation from the parent function, domain and range.

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

← right 3
↑ up 1



Domain:

$(-\infty, \infty)$

Range:

$(1, \infty)$

10.4 Graphing Exp/Logs

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



Domain:

$(-\infty, \infty)$

Range:

$(-\infty, 0)$

NORMAL FLOAT AUTO REAL RADIAN MP				
PRESS + FOR Δ Tbl				
X	Y1			
-9	-9E-4			
-8	-0.002			
-7	-0.007			
-6	-0.018			
-5	-0.05			
-4	-0.135			
-3	-0.368			
-2	-1			
-1	-2.718			
0	-7.389			
1	-20.09			

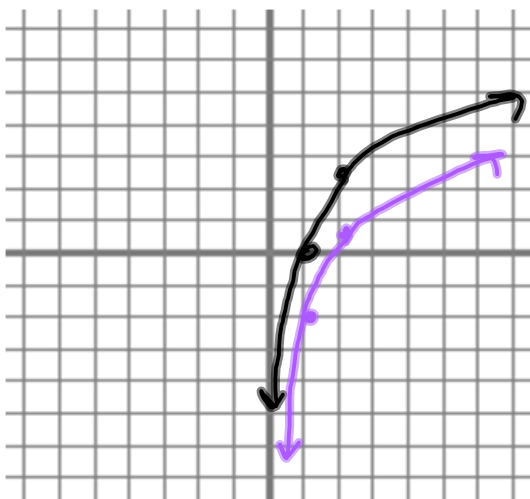
X=0

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

c) $y = \ln x - 2$

↑
down 2



Domain:

$(0, \infty)$

Range:

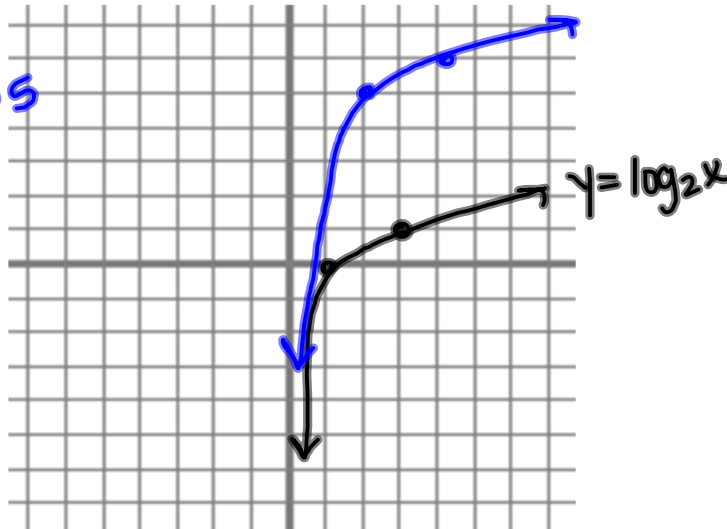
$(-\infty, \infty)$

10.4 Graphing Exp/Logs

E.Q: How do I graph exponential or log equations without a calculator?

D) $y = \log_2(x-1) + 5$

↑ right
↑ ups



Domain:

$(0, \infty)$

Range:

$(-\infty, \infty)$

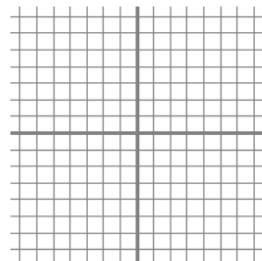
#1-9

10.4 - Graphing Logarithmic and Exponential Functions

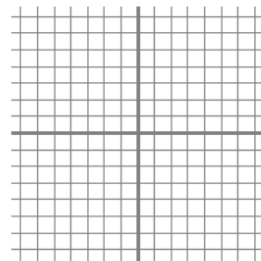
Name: _____

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.

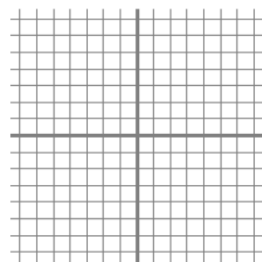
1. $y = 2^{x-1} + 3$



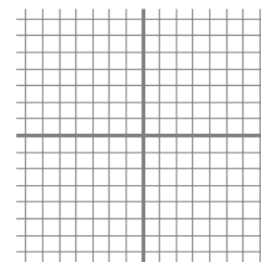
2. $y = e^{x+1}$



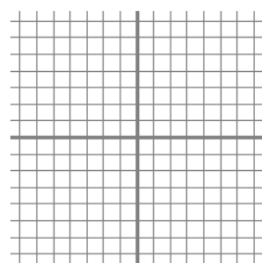
3. $y = -\ln x$



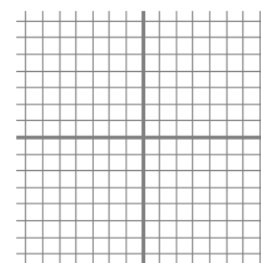
4. $y = \left(\frac{1}{2}\right)^x + 1$



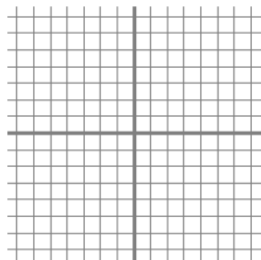
5. $y = \frac{1}{2} \log_4 x$



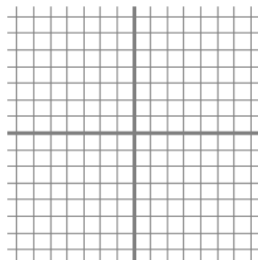
6. $y = \log_2(x-3)$



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



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



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

