

Happy Monday, October 24!

Do Now:

-Take home old warm-ups

- Condense the following

$$8^x = 1$$

Quiz Thursday

$$\log_8(x+9) + \log_8(x-9) - \log_8(x^2-81)$$

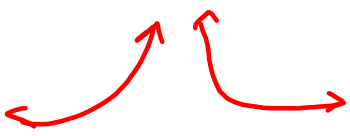
$$\frac{(x+9)(x-9)}{(x^2-81)} \log_8(x^2-81) - \log_8(x^2-81)$$

$$\log_8 \frac{x^2-81}{x^2-81} = \boxed{\log_8 1} = \boxed{0}$$

Oct 24-7:22 AM

Homework Questions and Solutions

Oct 24-7:25 AM



Why Do We Care?

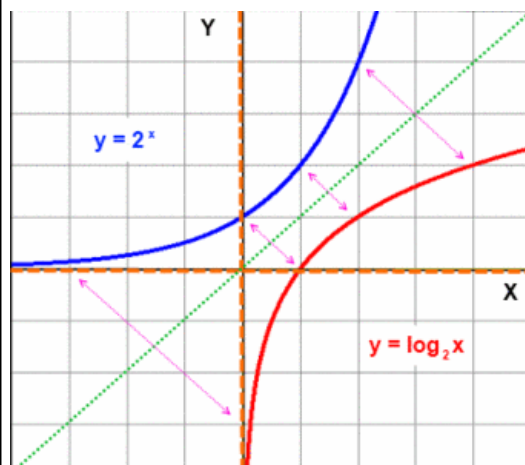
Exponentials

- Sales predicitions
- Viral video
- murder (Newton's Law)
- Bacteria growth

Logarithms

- Richter Scale earthquakes
- pH levels

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$$y = 2^x$$

x	y
-2	1/4
-1	1/2
0	1
1	2
2	4

$$2^y = x$$

$$y = \log_2 x$$

x	y
1/4	-2
1/2	-1
1	0
2	1
4	2

Oct 24-7:53 AM

An Example from Chemistry

pH = $-\log[H^+]$

0	10^0	1
1	10^{-1}	0.1
2	10^{-2}	0.01
3	10^{-3}	0.001
4	10^{-4}	0.0001
5	10^{-5}	0.00001
6	10^{-6}	0.000001
7	10^{-7}	0.0000001
8	10^{-8}	0.00000001
9	10^{-9}	0.000000001
10	10^{-10}	0.0000000001
11	10^{-11}	0.00000000001
12	10^{-12}	0.000000000001
13	10^{-13}	0.0000000000001
14	10^{-14}	0.00000000000001

pH of our eyes is about 7.4

We want to balance this!!



Oct 24-7:27 AM

$$y = \log_{10} x$$

Two Different Pools

$$pH = -\log(H^+)$$

7.4

H^+ is 0.00000000398



8.4

H^+ is 0.000000000398



Oct 24-7:41 AM

What do you notice about the graph?

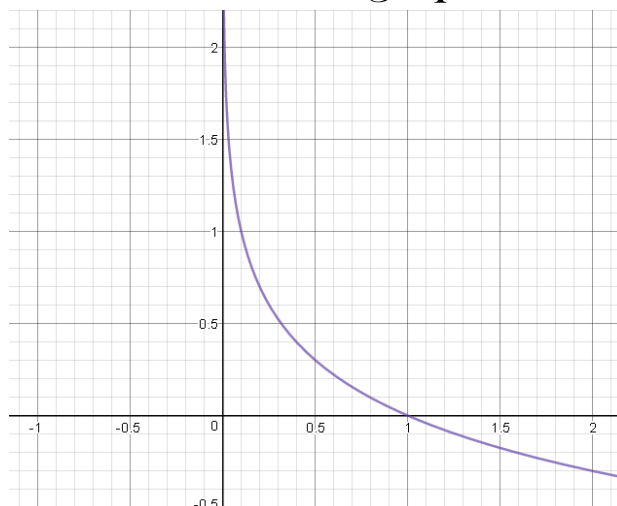
decreasing
VA: $x=0$

$(1, 0)$

X-intercept

No y-int.

VA



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$$\log_{\frac{1}{10}} X$$

$$\Rightarrow -\log_{10} X$$

Oct 24-9:07 AM

$$b^{y-h} = x-k \quad f(x) = \log_b(x-k) + h$$

$$y-h = \log_b(x-k)$$

What would make it increase instead of decrease?

$$b > 1 \quad \text{increasing}$$

$$0 < b < 1 \quad \text{decreasing}$$

What does changing k do?

Whole graph (VA, x-int)
Left or right

What does changing h do?

Up/down

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Homework: Graphing logarithms worksheet

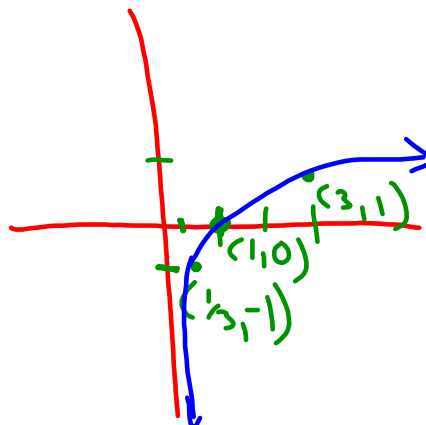
Exit Slip:

Sketch a graph of

$$f(x) = \log_3 x$$

$$3^y = x$$

x	y
1/3	-1
1	0
3	1



Oct 23-9:14 PM