Warm Up

1) Find the inverse.

a) $y=6^x+1$

$x=6^y+1$

$-1 \quad -1$

$x-1=6^y$

$6^y=x-1$

$\log_6 x-1=y$

b) $y=e^{x+4}$

$\ln(x)=\cancel{\ln} e^{y+4}$

$\ln(x)=y+4$

$\ln(x)-4=y$

c) $y=\log_2 x+1$ $\quad \log_2 y=x-1$

$x=\log_2 y+1$

$-1 \quad -1$

$x-1=\log_2 y$

$2^{x-1}=y$

d) $y=\log_{10}(x+1)$ $\quad 10^x=y+1$

$x=\log_{10}(y+1)$

$\log_{10}(y+1)=x$

$10^x-1=y$

2) Graph. State domain, range, and asymptote.

$y=\log_4 x+1$ up 1

$y=\log_4 x$

$x=\log_4 y$

$4^x=y$

x	y
-2	$4^{-2}=\frac{1}{16}$
-1	1/4
0	1
1	4
2	16

$\log_4(x+1)$

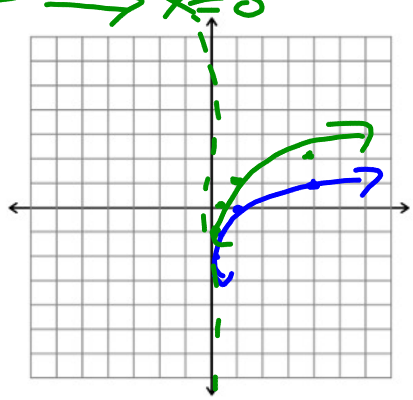
$\rightarrow$ D: $(0,\infty)$

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

$\rightarrow x=0$

$y=\log_4 x$

x	y
1/16	-2
1/4	-1
1	0
4	1
16	2



$$y = e^x + 4$$

$$x = e^y + 4$$

$$-4 \qquad\qquad -4$$

$$\ln x-4 = \ln \cancel{e}\ y$$

$$\ln(x-4) = y$$

1 a $\log_{1/2} 8 = -3$

b $\log_3 27 = 3$

c $\log_{16} 1/4 = -1/2$

d $\log_4 1/2 = -1/2$

2 a $y = 5^x - 1$

$x = 5^y - 1$

$x + 1 = 5^y$

$\boxed{5^y = x} + 1$

$\log_5 x + 1 = y$

2 b $y = e^{x+2}$

$\ln x = \cancel{\ln e}^{y+2}$

$\ln(x) = y + 2$

$\ln(x) - 2 = y$

3 a $y = \log_{1/2} x + 3$

$x = \log_{1/2} y + 3$

$x - 3 = \log_{1/2} y$

$\log_{1/2} y = x - 3$

$\frac{1}{2}^{x-3} = y$

3 b $y = \log_{10}(x-1)$

$x = \log_{10}(y-1)$

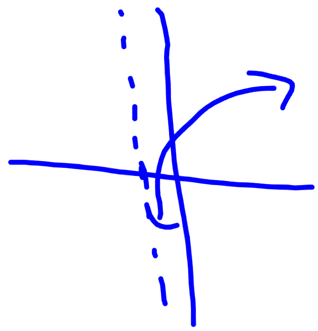
$\log_{10}(y-1) = x$

$10^x = y - 1$

$10^x + 1 = y$

4) $y = \log_2(x+1) + 3$

left 1
up 3
D: $(-1, \infty)$
R: $(-\infty, \infty)$
$x = -1$



<u>Homework Questions</u>

*Go over DLT

*Evaluating QUIZ

7.5 Properties of Logarithms

*How do I apply the properties of logarithms?

*How are those properties related to the properties of exponents?

*What is the change of base formula?

Properties of Logarithms

Property	Definition	Example
Product	$\log_b mn = \log_b m + \log_b n$	$\log_3 9x = \log_3 9 + \log_3 x$
Quotient	$\log_b \frac{m}{n} = \log_b m - \log_b n$	$\log_{\frac{1}{4}} \frac{4}{5} = \log_{\frac{1}{4}} 4 - \log_{\frac{1}{4}} 5$
Power	$\log_b m^p = p \cdot \log_b m$	$\log_2 8^x = x \cdot \log_2 8$
Equality	If $\log_b m = \log_b n$,, then $m = n$.	$\log_8(3x-4) = \log_8(5x+2)$ so, 3x – 4 = 5x+2

Log of a power:	$\log_a x^n = n\log_a x$
	$\ln x^n = n\ln x$
Log of a reciprocal:	$\log_a \frac{1}{x} = -\log_a x$
	$\ln \frac{1}{x} = -\ln x$
Log of the base:	$\log_a a = 1$
	$\ln e = 1$
Log of 1:	$\log_a 1 = 0$
	$\ln 1 = 0$

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

Expand:

$$\log_6 \frac{5x^3}{y}$$

$\log_6 5 + 3\log_6 x - \log_6 y$

Expand:

$$\log_7 \frac{3x^2}{5y^3}$$

$\log_7 3 + 2\log_7 x - \log_7 5 - 3\log_7 y$

or

$\log_7 3 + 2\log_7 x - (\log_7 5 + 3\log_7 y)$

TOYO

Expand:

A) $\log_{10} 3x^4$

$\log_{10} 3 + 4\log_{10} x$

B) $\ln 10x^3y$

$\ln 10 + 3\ln x + \ln y$


Log-a-rhythms

Condense:

$\log_{10} 9 + 3\log_{10} 2 - \log_{10} 3$

$\log_{10} \frac{9 \cdot 2^3}{3}$

Condense:

$\ln 8 + 2 \ln 5 - \ln 10$

$\ln \frac{8 \cdot 5^2}{10}$

Condense:

A) ln 4 +3 ln 3- ln12

$\ln \frac{4 \cdot 3^3}{12}$

B) 3log$_2$ 3 +5log$_2$ 2-log$_2$ 8

$\log_2 \frac{3^3 \cdot 2^5}{8}$

*Activity

Page 510# 8-14 evens

Use log 4 = 0.602 and log 12=1.079 to evaluate the logarithm.

8) log 48

log 4·12

log 4 + log 12

0.602 + 1.079

1.681

10) log 64

$\log 4^3$

3 log 4

3(0.602)

12) log (1/3)

14) log (1/12)

Change of Base Formula

$$\log_c a = \frac{\log_{10} a}{\log_{10} c}$$

Use the change of base formula to evaluate the logarithm.

A) $\log_3 6$

$\frac{\log 6}{\log 3}$

B) $\log_6 17$

$\frac{\log 17}{\log 6}$

C) $\log_2 28$

D) $\log_7 19$

HW: ~~More Exciting #21-26~~

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