Unit10 Day 3 HW

1. See graph on next slide.
2. 3log x + log y
3. $\frac{1}{2}$ log a - log b
4. 3 log x + log y - 2log z
5. 2log r - log s - 1/2log t
6. (2)
7. (1)
8. (4)
9. $x = \frac{1}{2}$
10. x = 7

Name_____

Date_____

Alg 2 CC

Unit 10 Day 3 HW

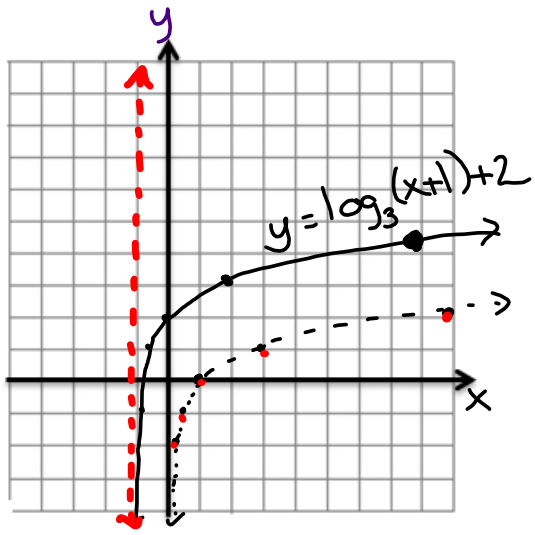
1. Graph $y = \log_3(x+1)+2$ left 1, up 2

Hint use the inverse to find your coordinates to plot. $y = 3^x$

x	-2	-1	0	1	2
y	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9

x	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9
y	-2	-1	0	1	2

$y = \log_3 x$



Use the laws of logarithms to expand questions 2 - 5.

2. $\log x^3y =$ $3\log x + \log y$

3. $\log \frac{\sqrt{a}}{b} =$ $\log a^{1/2} - \log b = \frac{1}{2}\log a - \log b$

4. $\log \frac{x^3y}{z^2} =$ $\log x^3 + \log y - \log z^2 = 3\log x + \log y - 2\log z$

5. $\log \frac{r^2}{s\sqrt{t}} =$ $\log r^2 - (\log s + \log t^{1/2})$
$= 2\log r - \log s - \frac{1}{2}\log t$

6. Which of the following is equivalent to $\log_3(9x)$?

(1) $\log_3 2 + \log_3 x$ (2) $2 + \log_3 x$

(3) $2\log_3 x$ (4) $x + \log_3 2$

$\log_3 9 + \log_3 x$

$2 + \log_3 x$

$\log_3 9 = x$

$3^x = 9 \quad 3^x = 3^2$

$x = 2$

7. The expression of $\log \frac{x^2}{10}$ is equivalent to

(1) $2\log x - 1$ (2) $2\log x - 10$

(3) $\log 2x - 1$ (4) $\log 2x - 10$

$\log x^2 - \log 10$

$2\log x - \log 10$

$2\log x - 1$

8. If $f(x) = \log x$ and $g(x) = 100x^3$, then $f(g(x)) =$

(1) $100 \log x$ (2) $300 \log x$

(3) $6 + \log x$ (4) $2 + 3\log x$

$= \log(100x^3)$

$= \log 100 + \log x^3$

$= \log 100 + 3\log x$

$= 2 + 3\log x$

9. Solve for x.

$5^{4x-5} = \frac{1}{125}$

$5^{4x-5} = 5^{-3}$

$4x-5 = -3$

$+5 \quad +5$

$\frac{4x}{4} = \frac{2}{4}$ $x = 1/2$

$\{\frac{1}{2}\}$

10. Algebraically determine the *zeroes* of the exponential function $f(x) = 2^{2x-9} - 32$. Recall that the reason it is known as a zero is because the *output is zero.*

$0 = 2^{2x-9} - 32$

$+32 \quad +32$

$32 = 2^{2x-9}$

$2^5 = 2^{2x-9}$

$5 = 2x-9$ $x = 7$

$+9 \quad +9$

$\frac{14}{2} = \frac{2x}{2}$

$\{7\}$

More Properties of Logarithms

More Properties of Logs

Unit 10 Day 4

Warm-up

The expression of $\log\left(\frac{x^2}{1000}\right)$ can be written in equivalent form as

(1) $2\log x - 3$
(2) $2\log x - 6$
(3) $\log 2x - 3$
(4) $\log 2x - 6$

$\log x^2 - \log 1000^3$

$2\log X - 3$

More Properties of Logs Unit 10 Day 4

Reverse Rules of Logs "Squish"

$\log a + \log b =$ $\log(ab)$

$\log a - \log b =$ $\log\left(\frac{a}{b}\right)$

$n \log a =$ $\log a^n$

$\frac{1}{n}\log a =$ $\log a^{\frac{1}{n}} = \log \sqrt[n]{a}$

Express as a single logarithm:

1. $2 \log a - \log b =$ $\log a^2 - \log b = \log\left(\frac{a^2}{b}\right)$

2. $\log a - \frac{1}{2}\log b =$ $\log a - \log\sqrt{b} = \log\left(\frac{a}{\sqrt{b}}\right)$

3. $3 \log x + \frac{1}{2}\log y =$ $\log x^3 + \log\sqrt{y}$

$\log\left(x^3\sqrt{y}\right)$

4. $\log x^3y^5 - \log xy^3 =$ $\log\left(\frac{x^3y^5}{xy^3}\right) = \log(x^2y^2)$

5. $\log a - 1/3\log b - 1/3\log c =$ $\log a - \log\sqrt[3]{b} - \log\sqrt[3]{c}$

$= \log\left(\frac{a}{\sqrt[3]{bc}}\right)$

Change of Base Law:

$$\log_B A = \frac{\log A}{\log B}$$

"Base 10"
use calculator

Evaluate. Give an exact value where possible, otherwise round to four decimal places.

5. $\log_9 27 = \frac{\log 27}{\log 9}$ $= 1.5$

6. $\log_{32} 8 = \frac{\log 8}{\log 32}$ $= .6$

7. $\log_4 87 = \frac{\log 87}{\log 4}$ 3.2215

Express as a single logarithm. Simplify if possible.

8. $\log_6 3 + \log_6 2 =$ $\log_6(3\cdot 2) = \log_6 6 = \frac{\log 6}{\log 6} = 1$

9. $\log_8 16 + \log_8 4 =$ $\log_8(16\cdot 4) = \log_8 64 = \frac{\log 64}{\log 8} = 2$

11. $\log_8 80 + \log_8 51.2 =$ $\log_8(80\cdot 51.2) = \log_8 4096 = \frac{\log 4096}{\log 8} = 4$

12. $\log 2 + \log 25 - \log 5 =$ $\log(2\cdot 25/5) = \log_{10} 10 = 1$

13. Which of the following is not equivalent to log 36?

(1) log 2 + log 18
(2) log 30 + log 6
(3) 2log 6
(4) log 4 + log 9

14. If log 5 = p and log 2 = q then log 200 can be written in terms of p and q as

(1) 4p + q
(2) 2(p + q)
(3) 2p + 3q
(4) 3p + 2q

$\log 200 = \log(25 \cdot 8) = \log(5^2 \cdot 2^3) = 2\log 5 + 3\log 2 = 2p + 3q$

Calc: $2(\log 5) + 3(\log 2) \stackrel{?}{=} \log 200$