Day 4 — ReWrite From Log to Exponential

1. $\log_7 49 = 2$ $7^2=49$
2. $\log_2 16 = 4$ $2^4=16$
3. $\log_5 125 = 3$ $5^3=125$
4. $\log_{16} 4 = \frac{1}{2}$ $16^{1/2}=4$
5. $\log_4 \frac{1}{4} = -1$ $4^{-1}=1/4$
6. $\log_3 \frac{1}{9} = -2$ $3^{-2}=1/9$

$Base^{exp}= answ$ $2^3=8$

$\log_{base} answ=exp$ $\log_2 8=3$

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Evaluate

7. $\log_9 81 = x$ $9^x=81$ $x=2$
8. $\log_8 1$ $x=0$
9. $\log_3 \frac{1}{3}$ $x=-1$
10. $\log_4 2 = x$ $4^x=2$ $x=1/2$
11. $\log_{27} 3 = x$ $27^x=3$ $x=1/3$
12. $\log_4 4^{2/3}=x$ $4^x=4^{2/3}$ $x = 2/3$

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Use your Calc to Evaluate

13. $\ln \sqrt{5}$ $\ln (5)^{1/2}$ .8047
14. $\log 110$ assume base 10 2.04
15. $\ln \frac{1}{2}$ -.693

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Find the inverse. Switch x & y … switch forms from log to exp

16. $y = \log_5 x$ $x = \log_5 y$ $5^x=y$
17. $y = \ln x$ $x = \ln y$ base is e $e^x=y$
18. $y = \log_{1/5} x$ $(1/5)^x=y$
19. $y = \log \frac{x}{2}$ base is 10 $10^x= y/2$
20. $y = \log_6(x + 2)$ $6^x = y + 2$ $y = 6^x - 2$
21. $y = \log_3 9x$ $3^x =9y$ $y=\frac{3^x}{9}$

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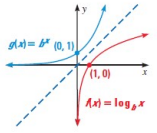
GRAPHING LOGARITHMIC FUNCTIONS You can use the inverse relationship between exponential and logarithmic functions to graph logarithmic functions.

KEY CONCEPT *For Your Notebook*

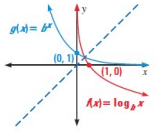
Parent Graphs for Logarithmic Functions

The graph of $f(x) = \log_b x$ is shown below for $b > 1$ and for $0 < b < 1$. Because $f(x) = \log_b x$ and $g(x) = b^x$ are inverse functions, the graph of $f(x) = \log_b x$ is the reflection of the graph of $g(x) = b^x$ in the line $y = x$.

Graph of $f(x) = \log_b x$ for $b > 1$



Graph of $f(x) = \log_b x$ for $0 < b < 1$



Note that the y-axis is a vertical asymptote of the graph of $f(x) = \log_b x$. The domain of $f(x) = \log_b x$ is $x > 0$, and the range is all real numbers.

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TRANSLATIONS You can graph a logarithmic function of the form $y = \log_b (x - h) + k$ by translating the graph of the parent function $y = \log_b x$.

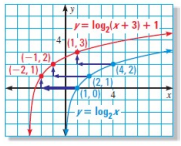
EXAMPLE 8 **Translate a logarithmic graph**

Graph $y = \log_2 (x + 3) + 1$. State the domain and range.

Solution

STEP 1 **Sketch** the graph of the parent function $y = \log_2 x$, which passes through (1, 0), (2, 1), and (4, 2).

STEP 2 **Translate** the parent graph left 3 units and up 1 unit. The translated graph passes through (−2, 1), (−1, 2), and (1, 3). The graph's asymptote is $x = -3$. The domain is $x > -3$, and the range is all real numbers.



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Just look at Pg 502

Graphing logs but don't stress

Homework is a worksheet found on website

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