

Unit #2: Logarithms
 Topic: Logarithmic Functions
 Objective: *SWBAT evaluate logarithmic expressions by using their knowledge of exponents.*

Warm Up #1:



Explain each of the following in your own words.

- 1) What is an exponential function?

- 2) What is the difference between a common log and a natural log?



The Log Function

So what exactly is a log??

A log is simply an _____. It is the _____ to which you must raise a particular base to get a specific result.

Think of the log function as the _____ of the exponential function.

Given $f(x) = 2^x$, we can see that $f(4) = \underline{\hspace{2cm}}$.

Then if $g(x) = \log_2 x$, we can see that $g(16) = \underline{\hspace{2cm}}$.

Therefore,

_____ \Leftrightarrow _____

Example #1:

 Solve for x in each of the following:

a) $\log_3 81 = x$	b) $x = \log_4 \frac{1}{64}$	c) $\log_2 \sqrt{32} = x$
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Things to Remember:

Common Logs	Natural Logs	Logs base b
$\log 1 = \underline{\hspace{2cm}}$	$\ln 1 = \underline{\hspace{2cm}}$	$\log_b 1 = \underline{\hspace{2cm}}$
$\log 10 = \underline{\hspace{2cm}}$	$\ln e = \underline{\hspace{2cm}}$	$\log_b b = \underline{\hspace{2cm}}$
$\log 10^x = \underline{\hspace{2cm}}$	$\ln e^x = \underline{\hspace{2cm}}$	$\log_b b^x = \underline{\hspace{2cm}}$
$10^{\log x} = \underline{\hspace{2cm}}$	$e^{\ln x} = \underline{\hspace{2cm}}$	$b^{\log_b x} = \underline{\hspace{2cm}}$

Example #2:

Evaluate the following:

a) $\log_7 7^{3x^2+2}$	b) $3\ln e$	c) $\log_{12} 12$	d) $e^{\ln 7-1}$
e) $\ln e^{2x}$	f) $\log_5 1$	g) $e^{\ln 2x}$	h) $e^{2+\ln 3}$


Assignment(s): pg. 236 #19-24, pg. 245 #73-86, pg. 276 #57-60

Problem Set #1:

Solve for x:

1) $\log_2 64 = x$	2) $x = \log_8 2^3$
3) $x = \ln e^{11}$	4) $\log_{\frac{1}{12}} \frac{1}{144} = x$
5) $x = \log 1$	6) $x = \ln \frac{1}{e}$
7) $x = \log_7 \frac{1}{343}$	8) $\log_{225} 15 = x$
9) $x = \log_4 \sqrt{2}$	10) $\log_{\sqrt{3}} 9 = x$

Evaluate each of the following:

11) $\log_{13} \frac{1}{13}$	12) $\ln \sqrt{e}$
13) $10^{\log 5}$	14) $3 \ln e^{x^2+4}$
15) $2^{\log_2 37}$	16) $e^{\ln \sqrt{7}}$
17) $\log_6 1$	18) $e^{\cos \pi + 3}$
19) $\ln e^e$	20) $\log 10^3$