Math 3

2·3 Intro to Logarithms

Unit 2 Day 3

OBJ: simplify and solve simple logarithm equations.

A logarithm is just a special way to ask a specific question.

THE QUESTION: What **exponent** is required to go from a **base "b"** to reach a value of **"a"**?

Note: Log x is a log that has no base written, it is implied that the base is _____.

Exponential Form	Logarithmic Form
Example:	Example:

SWOOSH Method

Used to convert between exponential form and logarithmic form (and vice versa)!

Logarithmic Form:	$\log_4 64 = y$		$\log_u \frac{15}{16} = v$		$\log_{\frac{7}{4}} x = y$	
Exponential Form:		$343^x = 7$		$\left(\frac{1}{5}\right)^x = y$		$b^a = 123$

Change of Base

$$\log_b a = \frac{\log a}{\log b}$$

Used when evaluating a logarithm that is not already in base 10. Be sure to write each out, and then evaluate using your calculator and the LOG button!

Example:	$\log_4 64$	$\log_3 \frac{1}{243}$	$\log_2 4$	$\log_2 16$	$\log_6 \frac{1}{216}$	$\log_5 125$
Written As:						
Solution:						

Solving using Simple Logarithms

SWOOSH Method	Change of Base	Log = Log
$\log_{\#}(x) = \#$	$\log_{\#}(\#) = x$	$\log(x) = \log(x)$
Use when a variable is attached to the logarithm.	Use when a constant is attached to the logarithm.	Use when <u>one</u> log is = to <u>one</u> other log. Logs must have the same base in order to cancel.

Example 1: Solving using the SWOOSH Method

a) $\log_2(2x + 1) = 4$ b) $\log_4(17x - 4) = 3$ c) $\log(2x - 5) = 2$

Example 2: Solving using Change of Base

a) $\log_2 8 = 3x + 3$ b) $\log_5 125 = x^2 - 2x$ c) $\log_2 16 = x^2$

Example 3: Solve by canceling the logs!

a) $\log_4(3x-1) = \log_4(2x+3)$

b) $\log_2(x-6) = \log_2(2x+2)$