Algebra 2 Name _____

7-3 Logarithm as Inverse Date _____ **A#1**

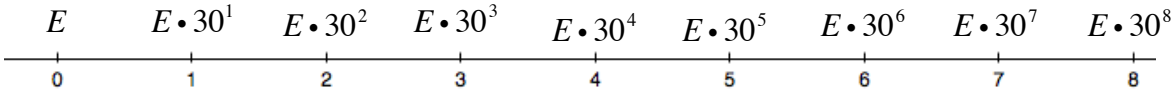
Goal: To write and evaluate logarithmic expressions

Review: Find the inverse of each operation that will isolate the variable.				
a. $x+2$	b. $x-16$	c. $4d$	d. $\frac{t}{3}$	e. g^2
f. h^3	g. $\sqrt{v}$	h. 2^b		

I. Introduction

The *magnitude* of an earthquake is a measure of the amount of energy released. The Richter scale measures the magnitude of earthquakes by using exponents. An earthquake of magnitude 5 releases about 30 times as much energy as an earthquake of magnitude 4.

Energy Released



Magnitude

The exponents used on the Richter scale are called **logarithms**, or logs.

Exponential Form	Logarithmic Form

II. Rewriting Examples: Rewrite each in exponential form.

a. $\log_3 81 = 4$

b. $\log_4 1 = 0$

c. $\log_9 9 = 1$

d. $\log_{10} 0.01 = -2$

e. $\log_{1/4} 4 = -1$

f. $\log_7 49 = 2$

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Practice

Rewrite the equation in exponential form.

1. $\log_2 8 = 3$ **2.** $\log_5 25 = 2$ **3.** $\log_3 27 = 3$

4. $\log_7 49 = 2$ **5.** $\log_2 16 = 4$ **6.** $\log_6 6 = 1$

1. $\log_4 16 = 2$ **2.** $\log_3 81 = 4$ **3.** $\log_2 1 = 0$

4. $\log_9 3 = \frac{1}{2}$ **5.** $\log_5 \frac{1}{5} = -1$ **6.** $\log_2 \frac{1}{8} = -3$

III. Evaluating Log

SPECIAL LOGARITHMIC VALUES

Let b be a positive real number such that $b \neq 1$.

Logarithm of 1 $\log_b 1 =$ ___ because b— $= 1$.

Logarithm of base b $\log_b b =$ ___ because b— $= b$.

Evaluate the expression.

a. $\log_2 64$ **b.** $\log_{1/2} 0.25$ **c.** $\log_{1/3} 27$ **d.** $\log_4 2$

Practice

Evaluate the expression without using a calculator.

7. $\log_2 4$ **8.** $\log_2 32$ **9.** $\log_8 64$

10. $\log_{10} 100$ **11.** $\log_7 1$ **12.** $\log_8 8$

10. $\log_3 27$ **11.** $\log_4 1$ **12.** $\log_2 \frac{1}{2}$

13. $\log_8 2$ **14.** $\log_5 5^{2/3}$ **15.** $\log_6 (-1)$