Topic: Rewriting Logarithms & Exponents

Name: _____

What am I learning today?

Date: _____

Warm-Up

Use your calculator to evaluate each expression:

1. $(3.4)^{6.8}$
2. $6^{2\pi}$
3. $100^{\sqrt{2}}$
4. $5000(2^{-1.5})$
5. $e^{9.2}$
6. $798^{\frac{1}{3}}$

Introduction

Vocabulary

Calculator

Using the Calculator, evaluate the following:

1. $\ln\sqrt{42}$ = _____
2. $\text{Log}\left(\frac{25}{2}\right)$ = _____
3. $\log_2 16$ = _____
4. $\log_{16}\left(\frac{1}{4}\right)$ = _____

What is a Logarithm?

Logarithmic Functions are…

_____ of **EXPONENTIAL FUNCTIONS**!!!

In fact, Exponential functions and Logarithmic functions are **INVERSES** of each other. (Inverse - think opposite)

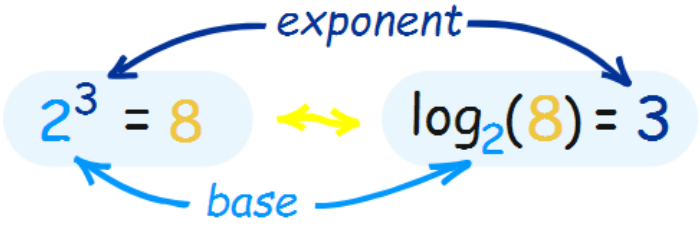
Log of *y* with base *b*

$\log_b y = x$ if and only if $b^x = y$

b ⇒ base

y ⇒ answer

x ⇒ exponent



EXPONENTIAL FORM LOGARITHMIC FORM

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Rewrite a Logarithmic as an Exponential

In order to write a logarithmic expression as an exponential expression, we say to: **"ROLL LIKE A LOG"**

Example: $\log_3 243 = 5$ ⟶ $3^5 = 243$

1. $\log_8 2 = \frac{1}{3}$

YOU TRY:

2. $\log_4 4 = 1$

3. $\log_7 \frac{1}{49} = -2$

Rewrite an Exponential as a Logarithmic

In order to write an exponential expression as a logarithmic expression, we say to: **"ROLL LIKE A LOG"**

Example: $4^3 = 64$ ⟶ $\log_4 64 = 3$

1. $5^0 = 1$

YOU TRY:

2. $\frac{1}{2}^{-1} = 2$

3. $3^{-3} = \frac{1}{27}$

Special Types of Logarithms

Common Logarithms

Natural Log & e^x

_____ _____ are logarithms with base = 10. We do not write the base when it is equal to 10.

Example: $\log_{10} 6 = \log 6$

Similar to π, "e" is a mathematical constant where $e = 2.7182818284\ldots$

_____ _____ are logarithms with base = e. It's denoted as "Ln" (called the "natural log").

Example: $\log_e \mathbf{12} = \ln \mathbf{12}$

Rewrite the exponential expression as a logarithmic expression.

1. $10^4 = 1000$

2. $e^4 = 54.598$

Rewrite the logarithmic expression as an exponential expression.

3. $\ln \mathbf{8} = \mathbf{2.079}$

4. $\log 4 = 0.602$

Summary

Summarize the lesson in your own words