Warm Up

Combine the exponential expressions:

1. $3^2 * 3^3 = 3^{2+3} = 3^5$
2. $5^4 \div 5^3 = 5^{4-3} = 5^1$
3. $3^2 * 4^2 = (3 \cdot 4)^2 = 12^2$

Objective: SWBAT use the properties of logarithms to rewrite expressions

Agenda:

- Warm Up
- HW Huddle
- Jigsaw
- Video(?)
- Notes
- Practice
- Reflection

Jigsaw

1. Work with your table partner to figure out the law of logarithms your example illustrates. Write an algebraic version and a verbal version of the law. (1 min)
2. Meet with members from the other groups and copy their laws (3 min)

Video

https://www.youtube.com/watch?v=N-7tcTIrers?t=4m50s

Notes: Logarithms

Logarithms are the inverse of exponentials, so they undo each other.

They are written like:

$$\log_b a$$

and read as "log base b of a."

remember, $b > 0$ and $b \neq 1$

Notes: From Exponential to Logarithmic

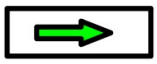
1. Identify the base of the exponential expression

   ex) $5^x = 125$ base: 5

2. Make it the base of the log (if it's e, use the natural log ln)

   $\log_5$

3. put the number on the other side in the log, and set the whole thing equal to the exponent

   $\log_5(125) = x$ 

   $x =$ ____

Notes: Properties of Logarithms

Product Property: $\log_b(xy) = \log_b(x) + \log_b(y)$

ex) $\log_2(4x) = \log_2 4 + \log_2 x = 2 + \log_2 x$

Quotient Property: $\log_b(x \div y) = \log_b(x) - \log_b(y)$

ex) $\log_5(2x/5) = \log_5(2x) - \log_5 5 = \log_5 2 + \log_5 x - 1$

Power Property: $\log_b(x^n) = n*\log_b(x)$

ex) $\ln(2e^{3x}) = \ln 2 + \ln(e^{3x})$

$3x \ln(e) + \ln(2)$

$3x + \ln(2)$

Practice

Precalculus pg. 185 #1-5 odd
19-25 odd
33-43 odd

Reflection

Explain how the laws of exponents and logarithms are equivalent.