7-4 Day 1 Properties of Logarithms

Remember that when you *multiply* powers with the same base, you ***add*** the exponents.

$$a^m a^n = \_\_\_a^{m+n}\_\_\_\_$$

Product Property of Logarithms

For any positive numbers *m*, *n*, and *b* (b ≠ 1)

WORDS	**NUMBERS**	**ALGEBRA**
The logarithm of a product is equal to the sum of the logarithm of its factors.	$\log_3 1000 = \log_3(10 \cdot 100)$ $= \log_3 10 + \log_3 100$	$\log_b mn$ $= \log_b m + \log_b n$

Remember that when you *divide* powers with the same base, you ***subtract*** the exponents.

$$\frac{a^m}{a^n} = \_\_a^{m-n}\_\_\_$$

1. Adding and Subtracting Logarithms

Express as a single logarithm. Simplify, if possible.

a) $\log_4 2 + \log_4 32$

$$\log_4(2 \cdot 32) = \log_4 64 = 3$$

b) $\log_5 625 + \log_5 25$

$$\log_5(625 \cdot 25) = \log_5 15625 = 6$$

7-4 Day 1
Properties of Logarithms

- Students will be able to use the product property of logarithms to simplify logarithms with 80% accuracy.

Remember that when you *multiply* powers with the same base, you *add* the exponents.

$$a^m a^n = \underline{\quad a^{m+n} \quad}$$

Product Property of Logarithms

For any positive numbers m, n, and b ($b \neq 1$)

WORDS	NUMBERS	ALGEBRA
The logarithm of a product is equal to the sum of the logarithm of its factors.	$\log_3 1000 =$ $\log_3(10 \cdot 100) =$ $\log_3 10 + \log_3 100$	$\log_b m + \log_b n$ $\log_b mn =$

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Name: _____ Date: _____ Period: _____

Worksheet 7-4 Day 1

Use the Product Property to express as a single logarithm. Then simplify.

1. $\log_6 12 + \log_6 18$

2. $\log_6 18 + \log_6 72$

3. $\log_8 128 + \log_8 256$

4. $\log_5 5 + \log_5 125$

5. $\log_8 80 + \log_8 51.2$

6. $\log_{10} 125 + \log_{10} 80$

7. $\log_3 9 + \log_3 27$

8. $\log_2 8 + \log_2 16$

9. $\log_3 6 + \log_3 13.5$

10. $\log_4 34 + \log_4 128$