

**7-4 Day 2 Properties of Logarithms**

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

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

*Quotient Property of Logarithms*

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

WORDS	NUMBERS	ALGEBRA
<i>The logarithm of a quotient is the logarithm of the dividend minus the logarithm of the divisor.</i>	$\log_5 \left( \frac{16}{2} \right)$ $= \log_5 16 - \log_5 2$	$\log_b \frac{m}{n}$ $\log_b m - \log_b n$

**1. Adding and Subtracting Logarithms**

Express as a single logarithm. Simplify, if possible.

a)  $\log_2 32 - \log_2 4$

$$\log_2 \left( \frac{32}{4} \right) = \log_2 8 = 3$$

b)  $\log_7 49 - \log_7 7$

$$\log_7 \left( \frac{49}{7} \right) = \log_7 7 = 1$$

# 7-4 Day 2

## Properties of Logarithms



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

$$\frac{b^m}{b^n} = b^{m-n}$$

### *Quotient Property of Logarithms*

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

WORDS	NUMBERS	ALGEBRA
The logarithm of a quotient is the logarithm of the dividend minus the logarithm of the divisor.	$\log_5 \left( \frac{16}{2} \right) =$ $\log_5 16 - \log_5 2$	$\log_b m - \log_b n$ $\log_b \left( \frac{m}{n} \right) =$

**1. Adding and Subtracting Logarithms**

Express as a single logarithm. Simplify, if possible.

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$$\log_7 \left( \frac{49}{7} \right) = \boxed{\log_7 7 = 1}$$

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

### Worksheet 7-4 Day 2

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

1.  $\log_2 80 - \log_2 10$

2.  $\log_{10} 4000 - \log_{10} 40$

3.  $\log_4 384 - \log_4 6$

4.  $\log_2 1920 - \log_2 30$

5.  $\log_3 486 - \log_3 2$

6.  $\log_6 180 - \log_6 5$

7.  $\log_3 81 - \log_3 27$

8.  $\log_2 256 - \log_2 64$

9.  $\log_7 13.3 - \log_7 1.9$

10.  $\log_4 128 - \log_4 8$