Part 1 Name: KEY

Topic: 8.5 Properties of Logarithms ~~(part 1)~~

Summary:

Complete the table below.

$\log_b m$	$\log_b n$	$\log_b mn$
$\log 10 =$ 1	$\log 100 =$ 2	$\log(10 * 100) =$ 3
$\log 0.1 =$ −1	$\log 0.01 =$ −2	$\log(0.1 * 0.01) =$ −3
$\log_2 4 =$ 2 *since $2^2=4$	$\log_2 8 =$ 3 *since $2^3=8$	$\log_2(4 * 8) =$ 5 *since $2^5=32$

Do you notice a pattern when you compare the first two columns to the third column?

The first column plus the second column equals the third column.

Properties of Logarightms

Product Property:

$$\log_b mn = \log_b m + \log_b n$$

Quotient Property:

$$\log_b \frac{m}{n} = \log_b m - \log_b n$$

Power Property:

$$\log_b m^n = n \log_b m$$

8.5

Use $\log_9 5 \approx 0.732$ and $\log_9 11 \approx 1.091$ to approximate the following.

1. $\log_9 \frac{5}{11}$

$\log_9 5 - \log_9 11$

$0.732 - 1.091$

-0.359

2. $\log_9 55$

$\log_9 (5 \cdot 11)$

$\log_9 5 + \log_9 11$

$0.732 + 1.091$

1.823

3. $\log_9 25$

$\log_9 (5 \cdot 5)$

$\log_9 5 + \log_9 5$

$0.732 + 0.732$

1.464

Use $\log_5 3 \approx 0.683$ and $\log_5 7 \approx 1.209$ to approximate the following.

4. $\log_5 \frac{7}{3}$

$\log_5 7 - \log_5 3$

$1.209 - 0.683$

0.526

5. $\log_5 9$

$\log_5 (3 \cdot 3)$

$\log_5 3 + \log_5 3$

$0.683 + 0.683$

1.366

6. $\log_5 27$

$\log_5 (3 \cdot 3 \cdot 3)$

$\log_5 (3) + \log_5 3 + \log_5 3 =$

$0.683 + 0.683 + 0.683 = 2.049$

Use $\log 2 \approx 0.301$ and $\log 7 \approx 0.845$ to approximate the following.

7. $\log 4$

$\log (2 \cdot 2)$

$\log 2 + \log 2$

$0.301 + 0.301$

0.602

8. $\log 14$

$\log (2 \cdot 7)$

$\log 2 + \log 7$

$0.301 + 0.845$

01.146

9. $\log \frac{7}{2}$

$\log 7 - \log 2$

$0.845 - 0.301$

0.544

10. $\log \frac{2}{7}$

$\log 2 - \log 7$

$0.301 - 0.845$

-0.544

11. $\log 7^{-3}$

$\frac{1}{\log 7^3}$

$\frac{1}{3 \log 7}$

$-3 \log 7$

$-3(0.845) = -2.535$

12. $\log 49$

$\log (7 \cdot 7)$

$\log 7 + \log 7$

$(0.845) + 0.845$

1.690