

Name: _____

Date: _____

**5-7 LOGARITHM LAWS
MATH III HOMEWORK**

FLUENCY

1. Which of the following is not equivalent to $\log 36$?

(1) $\log 2 + \log 18$ (3) $\log 30 + \log 6$

(2) $2\log 6$ (4) $\log 4 + \log 9$

2. The $\log_3 20$ can be written as

(1) $2\log_3 2 + \log_3 5$ (3) $\log_3 15 + \log_3 5$

(2) $2\log_3 10$ (4) $2\log_3 4 + 3\log_3 4$

3. Which of the following is equivalent to $\log\left(\frac{x^3}{\sqrt[3]{y}}\right)$?

(1) $\log x - \log y$ (3) $3\log x - \frac{1}{3}\log y$

(2) $9\log(x - y)$ (4) $\log(3x) - \log\left(\frac{y}{3}\right)$

4. The difference $\log_2(3) - \log_2(12)$ is equal to

(1) -2 (3) $\frac{1}{4}$

(2) $-\frac{1}{2}$ (4) 4

5. If $\log 5 = p$ and $\log 2 = q$ then $\log 200$ can be written in terms of p and q as

(1) $4p + q$ (3) $2(p + q)$

(2) $2p + 3q$ (4) $3p + 2q$



6. When rounded to the nearest hundredth, $\log_3 7 = 1.77$. Which of the following represents the value of $\log_3 63$ to the nearest *hundredth*? Hint: write 63 as a product involving 7.

(1) 3.54

(3) 3.77

(2) 8.77

(4) 15.93

7. The expression $4 \log x - \frac{1}{2} \log y + 3 \log z$ can be rewritten equivalently as

(1) $\log\left(\frac{x^4 z^3}{\sqrt{y}}\right)$

(3) $\log\left(\frac{x^4 z^3}{2y}\right)$

(2) $\log\left(\frac{6xz}{y}\right)$

(4) $\log\left(\frac{6x^4 z^3}{y}\right)$

8. If $k = \log_2 3$ then $\log_2 48 =$

(1) $2k + 3$

(3) $k + 8$

(2) $3k + 1$

(4) $k + 4$

9. If $g(x) = 8x^6$ and $f(x) = \log_4(2x)$ then $f(g(x)) = ?$

(1) $4 \log_4 x + 1$

(3) $2(3 \log_4 x + 1)$

(2) $3(\log_4 x + 2)$

(4) $6 \log_4 x + 4$

REASONING

10. Consider the exponential equation $4^x = 30$.

(a) Between what two consecutive integers must the solution to this equation lie? Explain your reasoning.

(b) Write $\log(4^x)$ as an equivalent product using the third logarithm law.

(c) The solution to the original equation is $x = \frac{\log(30)}{\log(4)}$, can you see why based on (b)? Evaluate this expression and check to see it is correct.

