Name: _____ Date: _____

LOGARITHM LAWS
COMMON CORE ALGEBRA II 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 $\log\left(x^3 / \sqrt[3]{y}\right)$?

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

   (2) $9\log(x - y)$ (4) $\log(3x) - \log\left(y/3\right)$ _____

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) $3p + 2q$

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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.