Name_____ Class _____ Date_____

7-4 Practice

Form G

Properties of Logarithms

Write each expression as a single logarithm.

1. $\log_5 4 + \log_5 3$

3. $\log_2 4 + \log_2 2 - \log_2 8$

5. $\log_4 60 - \log_4 4 + \log_4 x$

7. $2 \log x - 3 \log y$

9. $\log_3 4x + 2 \log_3 5y$

11. $\frac{1}{3}\log 3x + \frac{2}{3}\log 3x$

13. $(\log 3 - \log 4) - \log 2$

15. $\log_6 3 - \log_6 6$

17. $\log_3 2x - 5\log_3 y$

19. $\frac{1}{2}\log x + \frac{1}{3}\log y - 2\log z$

21. $\log_5 y - 4(\log_5 r + 2\log_5 t)$

Expand each logarithm. Simplify if possible.

23. $\log_2 \frac{x}{yz}$

25. $\log 7(3x - 2)^2$

27. $\log \frac{5x}{4y}$

29. $\log \frac{2x^2 y}{3k^3}$

Use the Change of Base Formula to evaluate each expression. Round your answer to the nearest thousandth.

31. $\log_4 32$

33. $\log_2 15$

35. $\log_6 10$

37. $\log_8 1$

39. The concentration of hydrogen ions in a batch of homemade ketchup is 10^{-4}. What is the pH level of the ketchup?

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7-4 Practice (continued) *Form G*

Properties of Logarithms

Determine if each statement is *true* or *false*. Justify your answer.

41. $\log\frac{3}{5} = \frac{\log 3}{\log 5}$

43. $\frac{1}{2}\log_4 4x = \log_4 2x$

Use the properties of logarithms to evaluate each expression.

45. $\log_2 160 - \log_2 5$

47. $\log_7 14 - \log_7 2$

49. $\frac{1}{4}\log_3 162 - \log_3 \sqrt[4]{2}$

State the property or properties used to rewrite each expression.

51. $6 \log 2 = \log 64$

53. $\frac{1}{3}\log_2 x = \log_2 \sqrt[3]{x}$

55. $\log_4 20 - 3\log_4 x = \log_4 \frac{20}{x^3}$

The formula for loudness in decibels (dB) is $L = 10 \log\frac{I}{I_0}$, where I is the intensity of a sound in watts per square meter (W/m^2) and I_0 is 10^{-12} W/m^2, the intensity of a barely audible sound.

57. Suppose you decrease the intensity of a sound by 45%. By how many decibels would the loudness be decreased?