NAME:______________________________

1. What question would you ask yourself to evaluate $\log_3 81$?

2. If you know the value of log 35 and log 7, show how you can find the value of log 5 without using the log function on a calculator.

3. Identify the error in the following process. Show the correct steps to rewrite $\log\left(1 + \frac{64}{x^3}\right)$ as a sum or difference of logarithms.

$$\log\left(1 + \frac{64}{x^3}\right) = \log(1) - \log\left(\frac{64}{x^3}\right) = -\log 64 + 3\log x$$

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4. Use a graphing calculator to demonstrate the power property of logarithms. Explain what you did and what you noticed.

5. Explain why $\log\left(\frac{30}{6}\right) \neq \frac{\log 30}{\log 6}$.

6. Write an equation using an exponent. Then write the related logarithmic equation.

7. Write a single logarithm as a sum of two logarithms.

[1] What power of 3 is equal to 81?

[2] $\log 5 = \log(35 \div 7)$; $\log 5 = \log 35 - \log 7$

[3] $\log\left(1 + \frac{64}{x^3}\right) \neq \log(1) - \log\left(\frac{64}{x^3}\right)$

The correct steps are

$$\log\left(1 + \frac{64}{x^3}\right) = \log\left(\frac{x^3 + 64}{x^3}\right) = \log\frac{(x+4)(x^2-4x+16)}{x^3} = \log(x+4) + \log(x^2-4x+16) - 3\log x$$

[4] Answers may vary. Sample: Graph $y = 2\log x$ and $y = \log x^2$ on the same set of axes.

[5] By the quotient property of logarithms, $\log\left(\frac{30}{6}\right) = \log 30 - \log 6$.

[6] Answers may vary. Sample: $1000 = 10^3$; $\log_{10} 1000 = 3$

[7] Answers may vary. Sample: $\log 14 = \log 2 + \log 7$