Student: Cole Lamers **Date:** 06/23/19	**Instructor:** Kelly Galarneau **Course:** CA&T Internet (70263) Galarneau	**Assignment:** 4.3 Rules of Logarithms

1. $\log_a MN =$ _____ + _____.

Choose the correct answer below.

- **A.** $\log_a MN = \log_a M + \log_a N$
- **B.** $\log_a MN = M \log_a N + N \log_a M$
- **C.** $\log_a MN = M + \log_a N$
- **D.** $\log_a MN = \log_a M + N$

2. $\log_a M^r =$ _____.

$\log_a M^r = r \log_a M$

3. $\log_a (u + v) = \log_a u + \log_a v$. State whether the statement is true or false.

Choose the correct answer below.

- True
- False

4. Use $\log_b 4 = 1.386$ and/or $\log_b 7 = 1.946$ to find $\log_b 28$.

$\log_b 28 =$ 3.332

5. Given that $\log x = 3$, $\log y = 7$, and $\log 5 \approx 0.7$, evaluate the following expression without using a calculator.

$\log (5x^2y)$

$\log (5x^2y) \approx$ 13.7 (Type an integer or a decimal.)

6. Watch the video and then solve the problem given below.

Click here to watch the video.[1]

Write the expression $\log_7 \dfrac{x^3(3x+2)^2}{(x-5)^4}$ in expanded form.

$\log_7 \dfrac{x^3(3x+2)^2}{(x-5)^4} =$ $3 \log_7 x + 2 \log_7 (3x+2) - 4 \log_7 (x-5)$

1: http://mediaplayer.pearsoncmg.com/assets/ii54F1eDgFfJUZJdhM4DXkWlVyscF_C6?clip=2

7. Write the following expression in expanded form.

$\ln[x(x-7)]$

$\ln[x(x-7)] = \ln(x) + \ln(x-7)$

8. Write the following expression in expanded form.

$\log \dfrac{\sqrt{x^2+5}}{x+3}$

Choose the correct answer below.

- A. $\log \dfrac{\sqrt{x^2+5}}{x+3} = 2\log\left(x^2+5\right) + \log(x+3)$
- B. $\log \dfrac{\sqrt{x^2+5}}{x+3} = \dfrac{1}{2}\log\left(x^2+5\right) - \log(x+3)$
- C. $\log \dfrac{\sqrt{x^2+5}}{x+3} = 2\log\left(x^2+5\right) - \log(x+3)$
- D. $\log \dfrac{\sqrt{x^2+5}}{x+3} = \dfrac{1}{2}\log\left(x^2+5\right) + \log(x+3)$

9. Express in terms of logarithms without exponents.

$\log_c\left(x^2y^4z\right)$

What is the equivalent expression?

$2\log_c(x) + 4\log_c(y) + \log_c(z)$

10. Watch the video and then solve the problem given below.

Click here to watch the video.[2]

Write the expression $2\ln(5x+3) - 5\ln(x-3) - 4\ln x$ in condensed form.

$2\ln(5x+3) - 5\ln(x-3) - 4\ln x = \ln \dfrac{(5x+3)^2}{x^4(x-3)^5}$

2: http://mediaplayer.pearsoncmg.com/assets/ii54F1eDgFfJUZJdhM4DXkWlVyscF_C6?clip=3

11. Write the sum as the logarithm of a single expression. Assume that variables represent positive numbers.

$\log_2 9 + \log_2 z$

$\log_2 9 + \log_2 z = \log_2(9z)$

12. Write the given expression in condensed form.

$\frac{1}{2}\log x - \log(9y) + \log(5z)$

$\frac{1}{2}\log x - \log(9y) + \log(5z) = \log\frac{5z\sqrt{x}}{9y}$

(Type an exact answer. Use integers or fractions for any numbers in the expression.)

13. Write the following expression in condensed form.

$\ln a + 4\ln b + 6\ln c$

$\ln a + 4\ln b + 6\ln c = \ln\left(ab^4c^6\right)$ (Simplify your answer.)

14. Watch the video and then solve the problem given below.

Click here to watch the video.[3]

Use the base changing formula to compute $\log_3 12$.

$\log_3 12 \approx$ 2.262 (Round to the nearest thousandth as needed.)

3: http://mediaplayer.pearsoncmg.com/assets/ii54F1eDgFfJUZJdhM4DXkWlVyscF_C6?clip=5

15. Use the change of base formula to find the value of the following logarithm. Do not round logarithms in the change of base formula.

$\log_4 18$

$\log_4 18 =$ 2.085

(Simplify your answer. Do not round until the final answer. Then round to four decimal places as needed.)

16. Use the change–of–base formula and a calculator to evaluate the following logarithm.

$\log_7 2 + \log_3 4$

$\log_7 2 + \log_3 4 =$ 1.6

(Simplify your answer. Type an integer or decimal rounded to one decimal place as needed.)

17. Find the value of the following expression without using a calculator.

$\log_6\sqrt{216}$

$\log_6\sqrt{216} = \frac{3}{2}$ (Simplify your answer. Type an integer or a fraction.)

18. Evaluate the expression without using a calculator.

$\log_4\left(\log_2 16\right)$

$\log_4\left(\log_2 16\right) =$ 1

19. Find the value of the following expression without using a calculator.

$7^{2\log_7 4 + \log_7 3}$

$7^{2\log_7 4 + \log_7 3}$ = 48 (Simplify your answer.)

20. Find the value of the expression without using a calculator.

$\log 40 + 2\log 5$

Rewrite the expression as a single logarithm.

$\log 40 + 2\log 5 = \log$ 1000 (Simplify your answer.)

Evaluate the expression without using a calculator.

$\log 40 + 2\log 5 =$ 3 (Simplify your answer.)

21. Suppose that $2000 is invested in an account that pays interest compounded continuously. Find the amount of time that it would take for the account to grow to $5000 at 4.75%.

It would take approximately 19.3 years.
(Round to the nearest tenth.)