Name Key Date _____ Pd _____

6.5 Properties of Logarithmic Functions and Change of Base Formula DAY TWO CYU

☑ *Use when you get it right all by yourself*

S *Use when you did it all by yourself, but made a silly mistake*

H *Use when you could do it alone with a little help from teacher or peer*

G *Use when you completed the problem in a group*

X *Use when a question was attempted but wrong (get help)*

N *Use when a question was not even attempted*

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Evaluating logarithmic expressions	1 - 3	4	
Expanding logarithmic expressions	7	8	9, 10
Condensing logarithmic expressions	11	12, 13	14
Change-of-base formula	15 - 17		18
Making an Argument			19
Error Analysis		20	

Use $\log_7 4 \approx 0.712$ & $\log_7 12 \approx 1.277$ to evaluate the logarithm. Show all work to earn full credit.

1. $\log_7 3$ ≈0.565
2. $\log_7 16$ ≈1.424
3. $\log_7 48$ ≈1.989
4. $\log_7 \frac{1}{4}$ ≈ -0.712

Expand the logarithmic expression. Show all steps to earn full credit.

7. $\log_3 4x$ $\log_3 4 + \log_3 x$
8. $\log 10x^5$ $1 + 5 \log x$
9. $ln \frac{x}{3y}$ $\ln x - \ln 3 - \ln y$
10. $\log_7 5\sqrt{x}$ $\log_7 5 + \frac{1}{2}\log_7 x$

Condense the logarithmic expression. Show all steps to earn full credit.

11. $\log_4 7 - \log_4 10$ $\log_4 \frac{7}{10}$
12. $6 \ln x + 4 \ln y$ $\ln x^6 y^4$
13. $log_5 4 + \frac{1}{3} log_5 x$ $\log_5 4\sqrt[3]{x}$
14. $log_3 4 + 2log_3 \frac{1}{2} + log_3 x$ $\log_3 x$

Use the change-of-base formula to evaluate the logarithms. Give the exact (CRF) and the approximate answer, rounded to the thousandths.

15. $\log_4 7$

CRF $\frac{\log 7}{\log 4}$

≈ 1.404

16. $\log_9 15$

$= \frac{\log 15}{\log 9}$

≈ 1.232

17. $\log_6 17$

$= \frac{\log 17}{\log 6}$

≈ 1.581

18. $\log_7 \frac{3}{16}$

$= \frac{\log 3}{\log 7} - \frac{\log 16}{\log 7}$

≈ -0.860

19. **MAKING AN ARGUMENT** Your friend claims you can use the change-of-base formula to graph $y = \log_3 x$ using a graphing calculator. Is your friend correct? Explain your reasoning.

yes $y = \frac{\log x}{\log 3}$

20. **ERROR ANALYSIS** Describe and correct the error in expanding the logarithmic expression.

a) ✗ $\log_2 5x = (\log_2 5)(\log_2 x)$

added not multiplied

$\log_2 5x = \log_2 5 + \log_2 x$

b) ✗ $\ln 8x^3 = 3 \ln 8 + \ln x$

"3" is with the wrong term

$\ln 8x^3 = \ln 8 + 3 \ln x$

CYU Reflection: *How far can you go: basic, intermediate, or advanced?*

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.