

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Instructions:** Please complete the following problems. Answers are each associated with a letter that creates a secret word. You can find the key on the last page.

**Problem 1.** State the product, quotient, and power rules of logarithms

**Problem 2.** Evaluate:  $\log_2\left(\frac{1}{2}\sqrt{xy^2}\right)$ , given  $\log_2(x) = 6$  and  $\log_2(y) = 4$

**Problem 3.** Evaluate:  $\log_2\left(x^{\frac{1}{25}}y^{\frac{1}{25}}\right)$ , given  $\log_2(x) = 6$  and  $\log_2(y) = 4$

**Problem 4.** Write in expanded form:  $f(x) = \log_2\left[\frac{(x-1)(x+1)}{x^2-4}\right]$

**Problem 5.** Write in condensed form:  $f(x) = 2\ln(x) + \frac{1}{2}\ln(x^2-1) - \frac{1}{2}\ln(x^2+1)$

**Problem 6.** Write in expanded form:  $f(x) = \ln\left[\frac{a^2(b+1)}{c\sqrt{d}}\right]$

**Problem 7.** Write in condensed form:  $f(x) = 2\log(a) + \frac{1}{2}\log(b) - \frac{1}{3}\log(c) - 5\log d$

A	10
B	Yes
C	$\frac{2}{5}$
D	$\log(x)$
E	$\ln \left[ \frac{x^2 \sqrt{x^2 - 1}}{\sqrt{x^2 + 1}} \right]$
F	$\ln e$
G	$\frac{1}{3}$
H	$\frac{5}{5}$
I	$\log a + \log b$
J	$\log_a(MN) = \log_a M + \log_a N, \log_a\left(\frac{M}{N}\right) = \log_a M - \log_a N, \log_a M^r = r \log_a M$
K	$\log_2(x - 1) + \log_2(x + 1) - \log_2(x - 2) - \log_2(x + 2)$
L	False
M	$\ln a^2 + \ln(b + 1) - \ln c + \frac{1}{2} \ln d$
N	$\log(a^2 \sqrt{b} \cdot d^5 \sqrt[3]{c})$
O	$\log a - \log b$
P	0
Q	exponential functions
R	15
S	$\log \left[ \frac{a^2 \sqrt{b}}{d^5 \sqrt[3]{c}} \right]$
T	$2 \ln a + \ln(b + 1) - \ln c - \frac{1}{2} \ln d$
U	inverses
V	no solution
W	No
X	$\log_a(MN) = \log_a M - \log_a N, \log_a\left(\frac{M}{N}\right) = \log_a M + \log_a N, \log_a M^r = r^2 \log_a M$
Y	logarithmic functions
Z	True

What was the word you found?

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