College Algebra

Name: KEY

Unit 3 – Review

Date: _____ Period: _____

Write each equation in its inverse form.

	LOGARITHMIC FORM	EXPONENTIAL FORM
1.)	$\log_{\frac{1}{5}} 125 = -3$	$\frac{1}{5}^{-3} = 125$
2.)	$\log_{18} 324 = 2$	$18^2 = 324$
3.)	$\log_4 256 = 4$	$4^4 = 256$
4.)	$\log_{121} 1331 = 3/2$	$121^{\left(\frac{3}{2}\right)} = 1331$
5.)	$\log_9 \frac{1}{81} = -2$	$9^{-2} = \frac{1}{81}$
6.)	$\log_{1/8} \frac{1}{512} = -3$	$\left(\frac{1}{8}\right)^{-3} = \frac{1}{512}$
7.)	$\log_{\left(\frac{1}{12}\right)} 1728 = -3$	$\frac{1}{12}^{-3} = 1728$

Evaluate the expression using the change of base formula. If necessary, round to four decimal places.

8.) $\log_{14} 196 = x$

$14^x = 196$

$x = 2$

$\frac{\log 196}{\log 14}$

9.) $\log_7 \frac{1}{343} = x$

$7^x = \frac{1}{343}$

$x = -3$

$\frac{\log \frac{1}{343}}{\log 7}$

10.) $\log_{36} 216$

$\frac{\log 216}{\log 36}$

1.5

Expand or condense each logarithm.

11.) $\frac{1}{3}[2\log_4 4 - 2\log_4 5 - 5\log_4 x]$

$\log_4 \sqrt[3]{\frac{16}{25x^5}}$

12.) $\log_8 8a^5\sqrt{3}$

$\log_8 8 + 5\log_8 a + \frac{1}{2}\log_8 3$

$1 + 5\log_8 a + \frac{1}{2}\log_8 3$

13.) $\frac{1}{2}(\ln 7 + \ln x) - 3\ln y$

$\ln \frac{\sqrt{7x}}{y^3}$

14.) $\ln \frac{a^2b^3}{c^4}$

$2\ln a + 3\ln b - 4\ln c$

15.) $\log \frac{7x^2}{\sqrt{y}z^3}$

$\log 7 + 2\log x - \frac{1}{2}\log y - 3\log z$

16.) $2\ln x + \ln(x-5) - 3\ln y$

$\ln \frac{x^2(x-5)}{y^3}$

Solve. If necessary, round to 4 decimal places. Don't forget to check your answers!

17.) $49^{2x-3} = 343^{2x-6}$

$7^{2(2x-3)} = 7^{3(2x-6)}$

$4x - 6 = 6x - 18$

$12 = 2x$

$\boxed{x = 6}$

18.) $2^x + 13 = 35$

$2^x = 22$

$\log_2 22 = x$

$\frac{\log 22}{\log 2} = x$

$\boxed{x = 4.4594}$

19.) $7e^{2x} = 17.5$

$e^{2x} = 2.5 \rightarrow e^{2x} = 2.5$

$\frac{\ln 2.5}{2} = \frac{2x}{2}$ $\ln e^{2x} = \ln 2.5$

$2x = \ln 2.5$

$x = .4582$

20.) $\log_2(x) + \log_2(2x+3) = \log_2 9$

$\log_2 x(2x+3) = \log_2 9$

$2x^2 + 3x - 9 = 0$

$(2x-3)(x+3) = 0$

$x = \frac{3}{2}, -3$

21.) $\log_6 3x = 2$

$6^2 = 3x$

$36 = 3x$

$x = 12$

22.) $4^{2x^2+3x} = \left(\frac{1}{32}\right)^{3x+1}$

$2^{2(2x^2+3x)} = 2^{-5(3x+1)}$

$4x^2 + 6x = -15x - 5$

$4x^2 + 21x + 5 = 0$

$(4x+1)(x+5) = 0$

$x = -\frac{1}{4}, -5$

23.) $-2e^{9x-1} + 6 = -58$

$e^{9x-1} = 32$

$\ln 32 = 9x - 1$

$\frac{\ln 32 + 1}{9} = x$

$x = .4962$

24.) $\ln(1 - 3x) = 5$

$e^5 = 1 - 3x$

$\frac{e^5 - 1}{-3} = x$

$x = -49.1377$

25.) $\log(-11x + 2) = \log(x^2 + 30)$

$-11x + 2 = x^2 + 30$

$0 = x^2 + 11x + 28$

$0 = (x+7)(x+4)$

$x = -7, -4$

26.) $5^{3x+7} = 30$

$\log_5 30 = 3x + 7$

$\frac{\log_5 30 - 7}{3} = x$

$x = -1.6289$

27.) $2\log_4 x = 5$

$\log_4 x = 2.5$

$4^{2.5} = x$

$\boxed{x = 32}$

28.) $\log_3 2x - \log_3(x-3) = 1$

$\log_3 \frac{2x}{x-3} = 1$

$3^1 = \frac{2x}{x-3}$

$3x - 9 = 2x$

$\boxed{x = 9}$

29.) Describe the transformation of $f(x) = -\ln(x+5)$ compared to the parent function $f(x) = \ln x$.

a. Reflected over the x – axis, left 5

b. Reflected over the y – axis, right 5

c. Reflected over the x – axis, right 5

d. Reflected over the y – axis, left 5

30.) Describe the transformation of $f(x) = \log(2-x)$ compared to the parent function $f(x) = \ln x$. $\log x$

a. Reflected over the x – axis, left 2

b. Reflected over the y – axis, right 2

c. Reflected over the x – axis, right 2

d. Reflected over the y – axis, left 2