Algebra II
Quiz - Logarithms

Name: Key
Date: _____ Period: ____

1.) Convert the following to exponential form: $\log_4 1024 = 5$

$4^5 = 1024$

2.) Convert the following to logarithmic form: $e^5 = 148.4132$

$\ln 148.4132 = 5$

3.) Evaluate the following: $\log_6 57$

$\frac{\log 57}{\log 6} = 2.2564$

2.256

4.) Expand each of the following:

a.) $\ln(16x^4y^7)$

$\ln 16 + \ln x^4 + \ln y^7$

$\ln 16 + 4\ln x + 7\ln y$

b.) $\log_2 \sqrt[3]{\frac{3x^2}{y^5}}$

$\frac{1}{3}[\log_2 3 + \log_2 x^2 - \log_2 y^5]$

$\frac{1}{3}[\log_2 3 + 2\log_2 x - 5\log_2 y]$

5.) Condense each of the following:

a.) $4\log_7(x-2) - 3\log_7 y$

$\log_7 (x-2)^4 - \log_7 y^3$

$\log_7 \frac{(x-2)^4}{y^3}$

b.) $\ln x + 2\ln y - 4\ln m - \frac{1}{2}\ln n$

$\ln x + \ln y^2 - \ln m^4 - \ln \sqrt{n}$

$\ln \frac{xy^2}{m^4\sqrt{n}}$

6.) Solve each of the following equations for x. Be sure to check your solutions if necessary.

a.) $5^{x-3} = 4^{2x+6}$

$\log 5^{x-3} = \log 4^{2x+6}$

$\frac{(x-3)\cdot\log 5}{\log 5} = \frac{(2x+6)\cdot\log 4}{\log 5}$

$x-3 = (2x+6)\cdot .861$

$x-3 = 1.72x + 5.17$

$-x \quad -5.17 \quad -x \quad -5.17$

$\frac{-8.17}{0.72} = \frac{0.72x}{0.72}$

$\boxed{x = -11.34}$

b.) $\log_2 (x^2 - 6x) = 4$

$2^4 = x^2 - 6x$

$16 = x^2 - 6x$

$x^2 - 6x - 16 = 0$

$(x-8)(x+2) = 0$

$\boxed{x=8}$ $\boxed{x=-2}$

c.) $\log x + \log (x-1) = \log 20$

$\log x(x-1) = \log 20$

$x^2 - x = 20$

$x^2 - x - 20 = 0$

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

$\boxed{x=5}$ ~~$x=-4$~~

d.) $9^{4x-1} = 27^{x+2}$

$(3^2)^{4x-1} = (3^3)^{x+2}$

$8x - 2 = 3x + 6$

$-3x \quad -3x$

$5x - 2 = 6$

$+2 \quad +2$

$\frac{5x}{5} = \frac{8}{5}$

$\boxed{x = \frac{8}{5}}$

e.) $\log_5 (3x-2) = \log_5 (x+8)$

$3x - 2 = x + 8$

$-x \quad -x$

$2x - 2 = 8$

$\frac{2x}{2} = \frac{10}{2}$

$\boxed{x=5}$

f.) $\ln (x-2) = 4$

$e^4 = x - 2$

$54.598 = x - 2$

$\boxed{x = 56.598}$

or

$\boxed{x = 56.6}$