Logs and Exponentials Practice Test 2015-2016 **Name:**

Properties of Logarithms (Expanding & Condensing)

1	Use the properties of logarithms to evaluate $\log_2 8 + \log_2 32 + \log_2 16$. A. 16 B. 4 C. 12 D. 10
2	**W**rite the expression as a single logarithm: $3\log_b q + 6\log_b v$ a. $\log_b(q^3 v^6)$ c. $(3+6)\log_b(q+v)$ b. $\log_b(qv^{3+6})$ d. $\log_b(q^3 + v^6)$
3	Expand the logarithmic expression: $\log_3 \frac{d}{12}$ a. $\log_3 d - \log_3 12$ c. $\frac{\log_3 d}{\log_3 12}$ b. $-d\log_3 12$ d. $\log_3 12 - \log_3 d$
4	Write the equation in logarithmic form: $7^4 = 2401$ a. $\log_4 2401 = 7$ c. $\log 2401 = 4 \cdot 7$ b. $\log_7 2401 = 4$ d. $\log 2401 = 4$
5	Write the expression as a single natural logarithm: $3\ln x - 2\ln c$ a. $\ln \frac{x^3}{c^2}$ b. $\ln(x^3 + c^2)$ c. $\ln(x^3 - c^2)$ d. $\ln x^3 c^2$
6	Write the expression as a single natural logarithm $3\ln a - \frac{1}{2}(\ln b + \ln c^2)$ a. $\ln \frac{3a}{0.5bc^2}$ b. $\frac{3}{2}\ln \frac{a}{bc^2}$ c. $\ln \frac{a^3}{bc}$ d. $\ln \frac{a^3}{c\sqrt{b}}$
7	Which expression is the correct expansion of $\log_3 \left(\frac{x}{y}\right)^5$? A. $5\log_3 x - \log_3 y$ B. $5\log_3 x + \log_3 y$ C. $5(\log_3 x + \log_3 y)$ D. $5(\log_3 x - \log_3 y)$
8	Condense the following logarithmic expression. $4\log_5 a - 3\log_5 b$
9	Write the equation $\log_5 25 = 2$ in exponential form.

Solving Logarithmic & Exponential Equations

10	Use the Change of Base Formula to solve $15^{2x} = 36$. Round to the nearest ten-thousandth. a. 0.6616 b. 2.6466 c. 1.7509 d. 1.9091
11	Which value of x satisfies the equation $5(18^x) = 26$? Round to the nearest ten-thousandth.

12	Solve $\log(4x + 10) = 3$. a. $-\frac{7}{4}$ b. $\frac{495}{2}$ c. 250 d. 990
13	Solve $\ln 2 + \ln x = 5$. Round to the nearest tenth, if necessary. a. 50,000 b. 74.2 c. 10 d. 3
14	Solve. Round to the nearest thousandth: $6e^{4x} - 2 = 3$ a. –0.448 b. 0.327 c. 0.067 d. –0.046
15	Solve $5(6^{3m}) = 20$. Round to the nearest ten-thousandth.
16	What is the solution of $2e^{x-3} = 16$?

Applications & Exponential Growth and Decay

17	The pH of a liquid is a measure of how acidic or basic it is. The concentration of hydrogen ions in a liquid is labeled $\left[H^+\right]$. Use the formula pH = $-\log\left[H^+\right]$ to find the pH level, to the nearest tenth, of a liquid with $[H^+]$ about 6.5×10^{-3}. a. –3.8 b. 3.8 c. 2.2 d. 3.0
18	Suppose you invest $1600 at an annual interest rate of 4.6% compounded continuously. How much will you have in the account after 4 years? a. $800.26 b. $6,701.28 c. $10,138.07 d. $1,923.23
19	The amount of money in an account with continuously compounded interest is given by the formula $A = Pe^{rt}$, where P is the principal, r is the annual interest rate, and t is the time in years. Calculate to the nearest hundredth of a year how long it takes for an amount of money to double if interest is compounded continuously at 4%. Round to the nearest tenth.
20	Find the annual percent increase or decrease that $y = 0.35(2.3)^x$ models. a. 230% increase c. 30% decrease b. 130% increase d. 65% decrease
21	An initial population of 475 quail increases at an annual rate of 26%. Write an exponential function to model the quail population. What will the approximate population be after 3 years? a. $f(x) = 475(26)^x$; 8,348,600 c. $f(x) = (475 \cdot 0.26)^x$; 1,883,653 b. $f(x) = 475(1.26)^x$; 950 d. $f(x) = 475(0.26)^x$; 950
22	In a particular region of a national park, there are currently 330 deer, and the population increases at a rate of 11%.. a. Write and exponential function to model the deer population. b. Explain what each value in the model represents. c. Predict the number of deer that will be in the region after five years. d. How many years will it take for the deer population to be 1000? Round to the nearest 10^{th} of a year.