

Name: _____ Date: _____ Period: _____

Exponential and Logarithmic Equations HOMEWORK

Directions: Please show your work for each problem in the boxes provided or on a separate sheet of paper.

For questions 1-2, use the properties of logarithms to expand the logarithmic expression.	
1) $\ln 5A^3$	2) $\log_3 \left(\frac{B}{C}\right)$
For questions 3-4, use the properties of logarithms to condense the logarithmic expressions.	
3) $5\log_3 x + 8\log_3 w$	4) $\frac{1}{3}\log_2 7 - \log_2 Y$
For questions 5-8, solve the exponential and logarithmic equations below using one-to-one properties.	
5) $3^{x+3} = 9^{x-2}$	6) $4^{x-3} = \frac{1}{16}$
7) $\log(5x + 1) = \log(2x + 3) + \log 2$	8) $\log_8(3x + 10) = \log_8(4x + 5)$
For questions 9-12, solve the exponential and logarithmic equations below using inverse properties. Give your answers exactly and in approximate form rounded to three significant figures, if possible.	
9) $13^x = 93$	10) $-8(14^n) + 1 = -41$
11) $\log_6(-3n) = -2$	12) $\log_4(x - 3) + \log_4(x + 3) = 2$

13) Explain the relationship between the decay formula $N = N_0(1 + r)^t$ and the formula for determining half-life of a substance, $N = N_0 \left(\frac{1}{2}\right)^{\frac{t}{h}}$.

14) The intensity of light I decays over time t according to the equation $I = I_0 \cdot e^{-kt}$, where I_0 is the initial intensity and k is a constant. If the intensity becomes half $\left(\frac{I_0}{2}\right)$ after 5 hours ($t = 5$), find the value of k .

15) The half-life of Arsenic-74 is 17.5 days.

a) If 4 grams of Arsenic-74 are present in a body initially, how many grams are present 90 days later?

b) How long will it take for there to be less than 0.01 grams of Arsenic-74 in the body if 4 grams were present initially?