Name _____

HW 5-4

1.   Evaluate:

            a. $\log_4 64$

            b. $\log_2 32$

            c. $\log_7 49$

            d. $\log 10000$

2.   Complete the table of selected values for the exponential
            function f.

x	0		-1			
$f(x) = 4^x$		4		2	256	$\frac{1}{16}$

3.   Determine if each logarithm is defined. If not, explain why not. If it is defined, determine if the value is a whole number or not.

   a. $\log_3 12$

   b. $\log_3(-9)$

   c. $\log_{25} 5$

   d. $\log_4 \dfrac{1}{64}$

4.   The table gives values of a function g for selected values of x. Which of the following statements is supported by the table about the inverse function, g^{-1}?

x	1	3	5	7
$g(x)$	48	24	12	6

A) g^{-1} is an exponential function.

B) g^{-1} is not a function because g is not one-to-one.

C) As the input values of g^{-1} halve, the output values increase by 2.

D) As the input values of g^{-1} increase by 2, the output values halve.

5. Is it possible for a logarithmic function of the form $y = \log_b x$ to have negative outputs? Explain.

6. Write three logarithmic equations of the form $a = \log_b c$ where $b > c$ and $a, b,$ and c are rational numbers.

7. When you fold a piece of paper in half once, you have 2 regions. If you fold a paper in half twice, you have 4 regions.

    a. Explain in words what happens to the number of regions each time you fold the paper in half.

    b. How many times do you have to fold a piece of paper in half to get 64 regions?

    c. Write an equation for r, the number of regions formed if you fold a paper in half k times.

    d. Write an equation for k, the number of times you must fold a paper in half to get r regions.

    e. Which of your two equations would you use to figure out the answer in part b? Explain why you chose this equation.

8. There are 22 lily pads in a pond and this number doubles every week. Write, but do not evaluate, a logarithmic expression that can be used to determine the week in which the lily pad population reaches 400.

9. Determine if it is possible to write a logarithmic equation of the form $a = \log_b c$ where $c < b < a$. If so, give an example. If not, explain why not. (Note that, by definition, $b > 0$.)