Name: _____ Date:_____ Period: _____ **Review**

End-of-Unit 2B Review – Exponential and Logarithmic

Lessons 2.9 through 2.15

Reviews do NOT cover all material from the lessons but will hopefully remind you of key points. To be prepared, you must study all packets from Unit 2B.

1. The function f is given by $f(x) = 3log_2(x) + 8$. Find $f^{-1}(x)$.

$x = 3\log_2(y) + 8$

$x - 8 = 3\log_2(y)$

$\frac{x-8}{3} = \log_2(y)$

$2^{\frac{x-8}{3}} = y$

$f^{-1}(x) = 2^{\frac{x-8}{3}}$

2. ***Calculator Active:*** What is the solution to the equation $4 \cdot 2^{x+5} - 10 = 22$.

$+10 \quad +10$

$\frac{4 \cdot 2^{x+5}}{4} = \frac{32}{4}$

$2^{x+5} = 8$

$\log_2 8 = x+5$

$\log_2 8 - 5 = x$

$3 - 5 = x$

$-2 = x$

3. What are all of the solutions to the inequality: $\ln(x + 10) + \ln 5 \leq \ln(2x + 17)$

$x+10 > 0$ and $2x+17 > 0$

$x > -10$ and $2x > -17$

$x > -8.5$

NO SOLUTION AS THERE IS NO INTERSECTION

$\ln(5(x+10)) \leq \ln(2x+17)$

$5x + 50 \leq 2x + 17$

$3x + 50 \leq 17$

$3x \leq -33$

$x \leq -11$

4. ***Calculator Active:*** Mr. Sullivan used to collect football cards. When the Cleveland Browns drafted Johnny Manziel he just knew his rookie card would be worth a lot of money over time! Mr. Sullivan kept track of the value after every game Johnny Manziel played. The data is below.

Games Played	1	3	4	9
Value of Rookie Card ($)	57.50	37.77	32.74	18.55

a) What's a logarithmic regression equation that could model this situation?

$f(x) = 57.4 - 17.7 \ln x$

b) How many games would Johnny Manzeil need to play for his card to be worth $10?

$10 = 57.4 - 17.7 \ln x$

$\frac{-47.4}{-17.7} = \frac{-17.7 \ln x}{-17.7}$

$2.678 = \ln x$

$e^{2.678} = x$

$14.55 = x$

or 15 games

5. Let *a, b,* and *c* be positive constants. What is an equivalent expression to $\log_3\left(\frac{a^5b^2}{c^3}\right)$?

$\log a^5 + \log b^2 - \log c^3$

$5\log a + 2\log b - 3\log c$

6. ***Calculator Active***: The function *f* is given by $f(x) = log_3(x)$. The function *g* is given by $g(x) = log_3(81x)$. Rewrite the function using properties of logarithms and explain any transformations from *f(x)* to *g(x)*.

$g(x) = \log_3 81 + \log_3 x$

$g(x) = 4 + \log_3 x$

VERTICAL shift up 4 units

7. Using the tables below, determine if the data given is exponential, logarithmic or linear.. Explain your answer.

a.

x	5	7	11	19
y	1	2	3	4

This is logarithmic because the x-values increase at an exponential rate, while the y-values increase at a constant rate.

b.

x	1	2	3	4
y	1	2	4	8

This is exponential because the x-values increase at a constant rate while the y-values increase at an exponential rate.

c.

x	2	3	4	5
Log y	3	7	11	15

This is exponential because the x-values and the LOG of the y-values increase at a constant rate. It's a semi-log data that would be linear.

8. The function *f* is given by $f(x) = \log(3 - x) + 2$. Find the information below for *f*.

Asymptote: $x = 3$

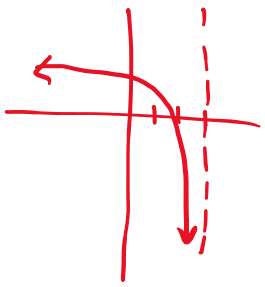
Domain: $(-\infty, 3)$

Range: $(-\infty, \infty)$ or $\mathbb{R}$

End Behavior: $x \to 3^-,\ f(x) \to -\infty$

$x \to -\infty,\ f(x) \to \infty$

Sketch of *f*:



$f(x) = \log(-(x-3)) + 2$