Integrated Math 3
12.4 Logarithmic Functions (Day 3) Review Worksheet

Name KEY
Date ________________ Period ______

1. Given $a=b^x$, match each vocabulary term with the appropriate variable or expression.

Base: b   Exponent: x   Power: a

2. List the restrictions OR describe all the possible values for each of the variables in $a=b^x$. *(*Hint: Is there any value that x cannot possibly be? b? a?)*

a: $a>0$

b: $b>0$ but $b\neq 1$

x: All real numbers

3. Given $log_b a$ = x , match each vocabulary term with the appropriate variable or expression.

Base: b   Exponent: x   Power: a

4. List the restrictions OR describe all the possible values for each of the variables in $log_b a$ = x. *(*Hint: Is there any value that x cannot possibly be? b? a?)*

a: $a>0$

b: $b>0$ but $b\neq 1$

x: All real numbers

5. When you are evaluating a logarithm, what are you solving for? That is, what does your answer represent?

The answer represents the exponent you were trying to find.

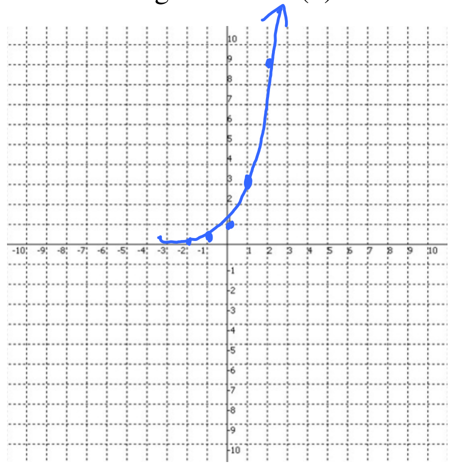
6. The function f(x) = 2^x has a domain of (-∞,∞) and a range of (0,∞). The inverse of f(x) would is

g(x)= $log_2 x$. List the domain and range of g(x).

Domain: $(0,\infty)$ Range: $(-\infty,\infty)$

7. Complete the provided table of values and graph the following function: $f(x) = 3^x$

x	y
-3	$\frac{1}{27}$
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9
3	27



8. List all the key characteristics of the exponential function $f(x) = 3^x$.

Domain: $(-\infty, \infty)$

y-intercept: $(0,1)$

Range: $(0, \infty)$

x-intercept(s): None

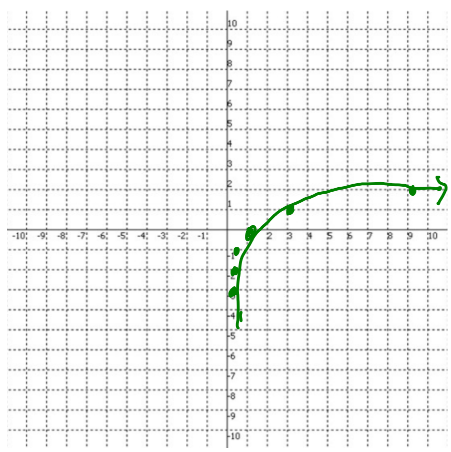
Interval of Increasing/Decreasing: $(-\infty, \infty)$

Asymptote(s): Horizontal $y=0$

End Behavior: $\lim_{x\to\infty} f(x)=\infty$ $\lim_{x\to-\infty} f(x)=0$

9. Graph the inverse function of $f(x) = 3^x$.

x	y
$\frac{1}{27}$	-3
$\frac{1}{9}$	-2
$\frac{1}{3}$	-1
1	0
3	1
9	2
27	3



10. List all the key characteristics of the inverse function. (Which is actually $g(x)= log_3(x)$

Domain: $(0, \infty)$

y-intercept: None

Range: $(-\infty, \infty)$

x-intercept(s): $(1,0)$

Interval of Increasing/Decreasing: $(0, \infty)$

Asymptote(s): Vertical $x=0$

End Behavior: $\lim_{x\to\infty} f(x)=\infty$ $\lim_{x\to 0^+} f(x)=-\infty$

Rewrite the equations in exponential form.

11. $log_4 256 = 4$

$4^4 = 256$

12. $log_{109} 1 = 0$

$109^0 = 1$

13. $log_{35} 35 = 1$

$35^1 = 35$

14. $log_{\frac{1}{5}} 25 = -2$

$\frac{1}{5}^{-2} = 25$

Rewrite the equations in logarithmic form.

15. $6^3 = 216$

$\log_6 216 = 3$

16. $4^{-2} = \frac{1}{16}$

$\log_4 \frac{1}{16} = -2$

17. $3 = 27^{\frac{1}{3}}$

$\log_{27} 3 = \frac{1}{3}$

Evaluate each logarithm.

18. $log_2 32 = x$

$2^x = 32$

$2^x = 2^5$

$x = 5$

19. $log_9 27 = x$

$9^x = 27$

$3^{2x} = 3^3$

$2x = 3$

$x = \frac{3}{2}$

20. $log_3 \frac{1}{9} = x$

$3^x = \frac{1}{9}$

$3^x = \frac{1}{3^2}$

$3^x = 3^{-2}$

$x = -2$

21. $log_{64} 2 = x$

$64^x = 2$

$2^{6x} = 2^1$

$6x = 1$

$x = \frac{1}{6}$

22. $log_{\frac{1}{5}} 125 = x$

$\frac{1}{5}^x = 125$

$5^{-1x} = 5^3$

$-1x = 3$

$x = -3$

23. $log_5 625 = x$

$5^x = 625$

$5^x = 5^4$

$x = 4$

Use your calculator to evaluate the logarithm. Round to the nearest thousandth.

24. $log\ -16$

DNE

25. $log\ 22$

1.342

26. $log\ .983$

$-.007$