Name ____________________

6-4 Reteach to Build Understanding

Logarithmic Functions

1. All exponential functions of the form $f(x) = b^x$ and logarithmic functions of the form $f(x) = \log_b x$ are ______________, because these functions have exactly one y-value for each ______________, so when the x and y are ______________, the inverses will also have ______________ x-value for each ______________.

2. Find and correct the error a student made when finding the inverse of the logarithmic funtion $f(x) = \log_6(4x + 2) - 5$.

$y = \log_6(4x + 2) - 5$ Write in $y = f(x)$ from.

$x = \log_6(4y + 2) - 5$ Interchange x and y.

$x + 5 = \log_6(4y + 2)$ Add 5 on each side.

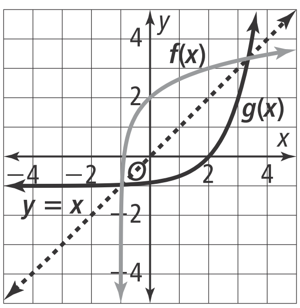
$6^x + 5 = 4y + 2$ Rewrite in exponent form.

$6^x + 3 = 4y$ Subtract 2 from each side.

$\frac{6^x + 3}{4} = y$ Divide by 4 on each side.

The equation of the inverse of $f(x) = \log_6(4y + 2) - 5$ is $f^{-1}(x) = \frac{6^x + 3}{4}$.

3. The $f(x) = 3^{(x-2)} - 1$ and $g(x) = \log_3(x + 1) + 2$ are inverse functions shown on the graph at the right. Complete the table without using a calculator.



$f(x) = 3^{(x-2)} - 1$		$g(x) = \log_3(x + 1) + 2$	
x	y	x	y
0	$-\frac{8}{9}$	$-\frac{8}{9}$	0
1	$-\frac{2}{3}$		
		0	2
3	2		
		8	4
5	26		
Domain:		Domain:	
Range: $\{y \mid y > -1\}$		Range: All real numbers	
x-intercept: 2; y-intercept: $-\frac{8}{9}$		x-intercept: $-\frac{8}{9}$; y-intercept: 2	
Asymptote:		Asymptote: $y = -1$	
End Behavior: As $x \to -\infty, y \to -1$ As $x \to \infty, y \to \infty$		End Behavior:	