Worksheet A: (Topic 2.10) Inverses of Exponential Functions Name: Solutions

Directions: Selected values for several functions are shown below. For each, determine if the given function could be logarithmic, exponential, or neither. Students are not required to find the function expressions.

1.

x	$f(x)$
0	1
3	4
6	9
9	16

Neither because the x values changing by adding 3 but the y values are squares of whole numbers.

$f(x) = \frac{1}{9}(x+3)^2$

2.

x	$g(x)$
0	1
1	4
2	16
3	64

Exponential because the x values changing by adding 1 and the y values are changing by multiplying by 4.

$g(x) = 4^x$

3.

x	$h(x)$
1	1
2	3
4	5
8	7

Logarithmic because the y values changing by adding 2 and the x values are changing by multiplying by 2.

$h^{-1}(x) = 2^{\frac{1}{2}(x-1)}$

$h(x) = 2\log_2 x + 1$

4.

x	$k(x)$
40	-1
20	-2
10	-3
5	-4

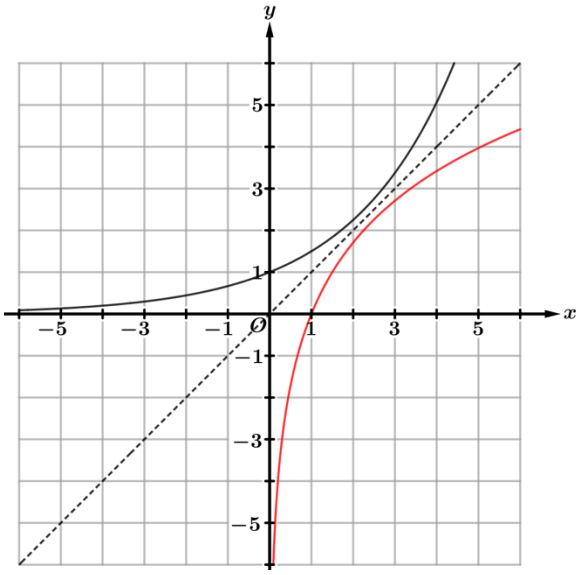
Logarithmic because the y values changing by subtracting 1 and the x values are changing by multiplying by $\frac{1}{2}$.

$k^{-1}(x) = 40(2)^{x+1}$

$k(x) = \log_2\left(\frac{x}{40}\right) - 1$

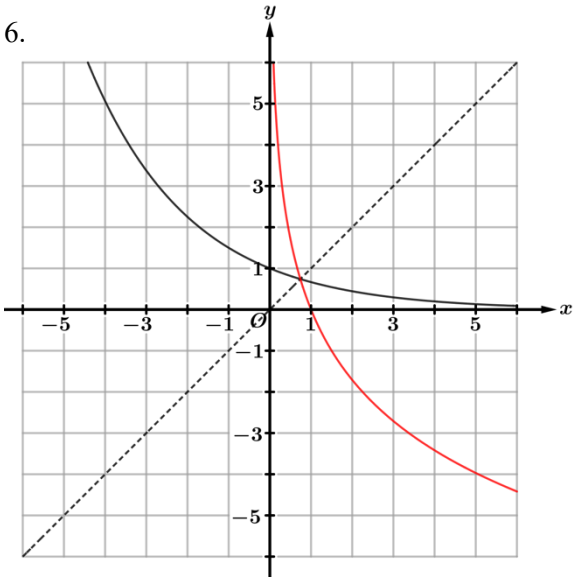
Directions: Portions of the graphs of the exponential functions $f(x) = a^x$ and $g(x) = b^x$ are shown below. Sketch the graphs of f^{-1} and g^{-1} on the axes as f and g.

5.



Graph of $f(x)$

6.



Graph of $g(x)$

Directions: Use the graphs above to approximate the following values.

7. $\log_a 3 \approx 2.7$

8. $\log_a \frac{1}{2} \approx -1.7$

9. $\log_b 4 \approx -3.4$

10. $\log_b \frac{3}{2} \approx -1$

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