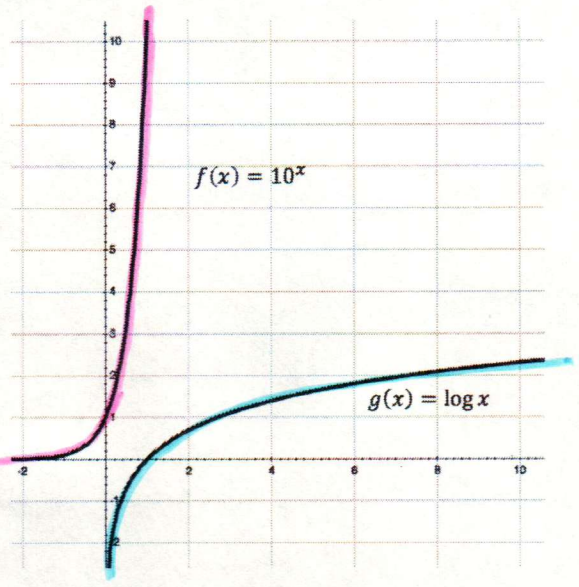
AGS 3 Name: _____ Period: _____ Date: _____

Notes 2.5 – Logarithm Practice

Warmup – Compare Log and Exponential Graphs

1. Give the features of $f(x)$.

domain: $\mathbb{R}$ y int: (0,1)
range: $(0, \infty)$ exponential
x-int: none increasing: $\mathbb{R}$



2. Give the features of $g(x)$.

domain: $(0, \infty)$
range: $\mathbb{R}$ logarithmic
x-int: (1,0) increasing: $(0, \infty)$
y int: none

Use the graphs of f(x) and g(x) to answer these questions as true or false.

true 3. Every graph of the form $g(x) = \log x$ will contain the point (1,0).

false 4. Both graphs have a vertical asymptote.

true 5. The functions are inverses of each other.

true 6. The range of $f(x)$ is the domain of $g(x)$.

false 7. The graph of $g(x)$ will never reach 3.

8. Give the equation of the asymptote for $g(x)$. $x = 0$

9. Give approximate values for:

$\log 5$	$\log 25$	$\log 2000$	$\log 10{,}000$
$\approx .699$	≈ 1.398	≈ 3.301	$= 4$

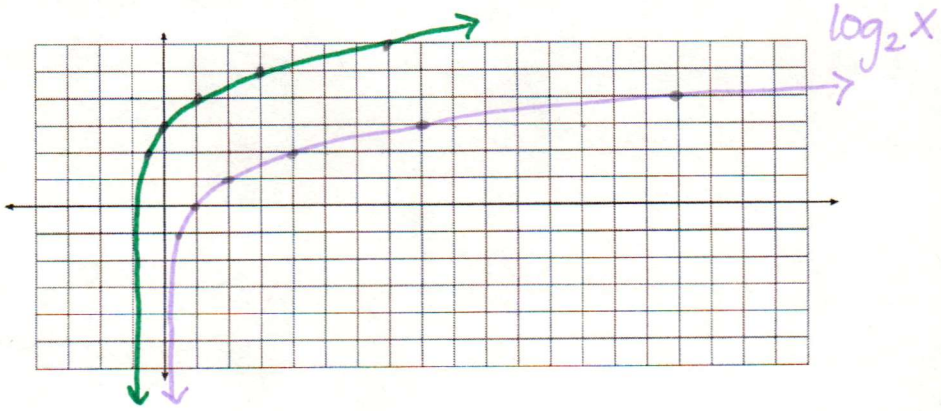
10. Describe the transformation of $g(x)$ if it becomes $g(x) = -3 + \log(x - 2)$.

down 3 right 2

Practice – Practice graphing using transformations. Then describe the transformation.

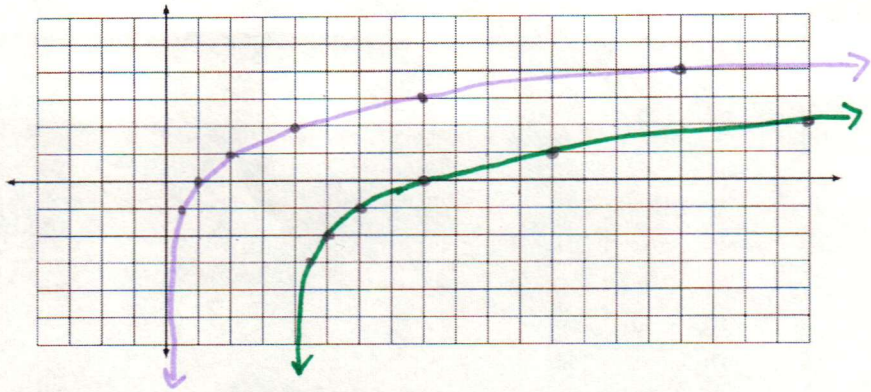
a. $f(x) = 3 + \log_2(x + 1)$

up 3
left 1



b. $g(x) = -2 + \log_2(x - 4)$

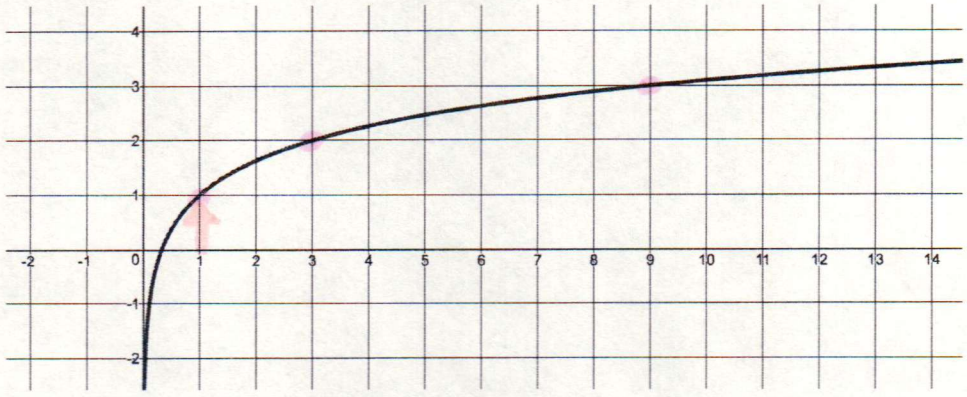
down 2
right 4



Write the equation of the given graph.

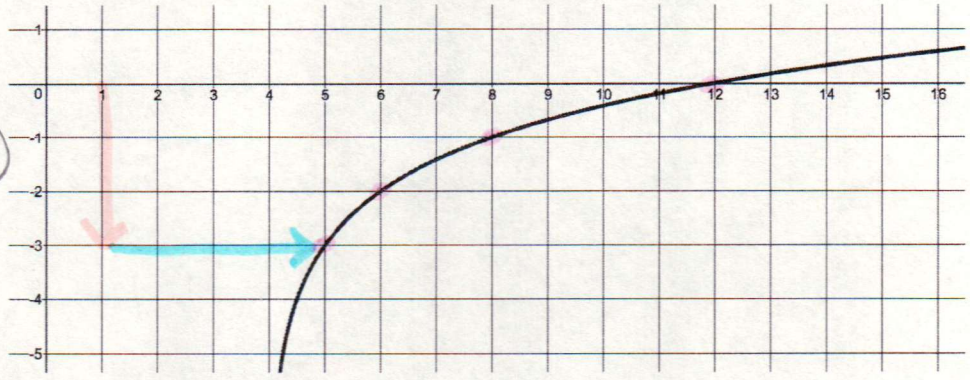
c.

$f(x) = 1 + \log_3 x$



d.

$f(x) = -3 + \log_2(x - 4)$



e. Give the equation of a logarithmic graph that has a vertical shift of up 7 and a horizontal shift of left $\frac{5}{2}$.

$f(x) = 7 + \log_x\left(x + \frac{5}{2}\right)$

f. Give the equation of a logarithmic graph that is the inverse of $k(x) = 3^{x-2} + 4$

$f(x) = 2 + \log_3(x-4)$

$y = 3^{x-2} + 4$

$y - 4 = 3^{x-2}$

$\log_3 y - 4 = x - 2$

Describe the transformations of the inverse equation.

up 2

right 4

Solve each equation for x.

g. $10^x = 10{,}000$

$x = 4$

h. $125 = 10^x$

$\log 125 = x$

$x \approx 2.097$

i. $10^{x+2} = 347$

$\log 347 = x + 2$

$x \approx .540$

j. $5(10^{x+2}) = 0.25$

$10^{x+2} = .05$

$\log .05 = x + 2$

$x \approx -3.301$

k. $10^{-x-1} = \frac{1}{36}$

$\log \frac{1}{36} = -x - 1$

$x \approx .556$

l. $-(10^{x+2}) = 16$

$10^{x+2} = -16$

$\log -16 = x + 2$

no solution

Simplify each expression using logarithmic properties.

m. $\log(4x^3)$

$\log 4 + 3\log x$

n. $\log\left(\frac{5x^2}{10x^3y}\right)$

$\log \frac{1}{2xy}$

$\log 1 - (\log 2 + \log x + \log y)$

$-\log 2 - \log x - \log y$