

Rewrite into logarithmic form.

1.  $2^m = 24$

$\log_2 24 = m$

2.  $3^x = 46$

$\log_3 46 = x$

Rewrite into exponential form.

3.  $\log_a 12 = c$

$a^c = 12$

4.  $\log_4 x = 20$

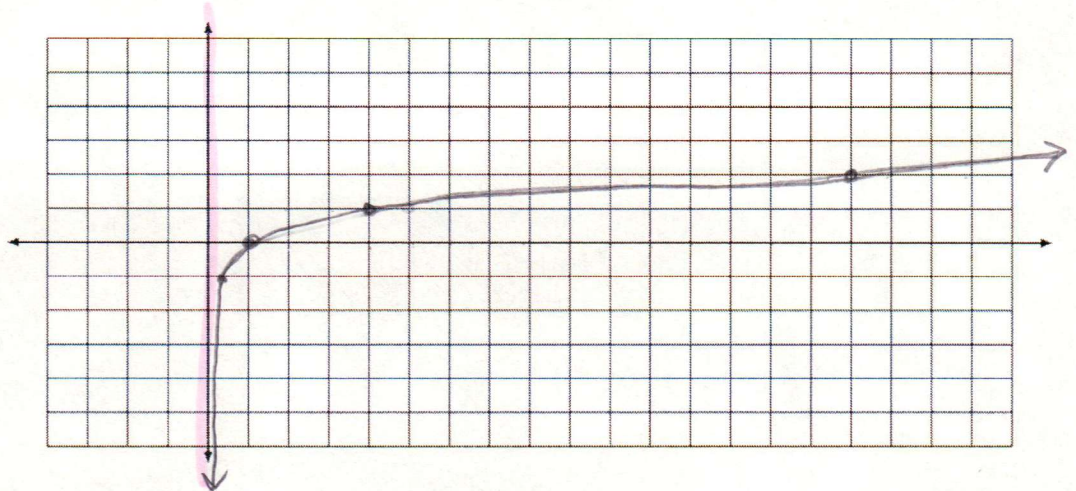
$4^{20} = x$

Graph each logarithmic function.

5.  $f(x) = \log_4 x$

$4^y = x$

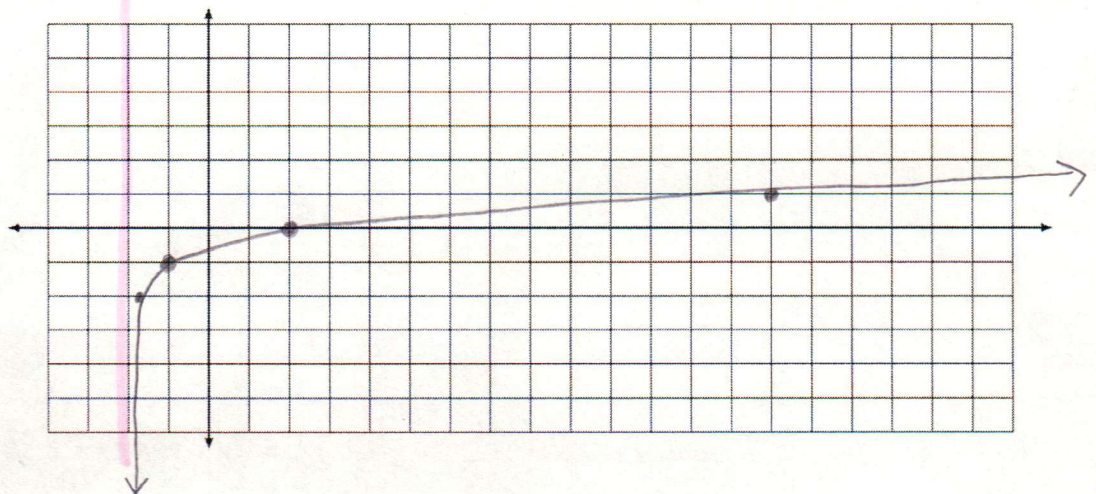
x	y
$\frac{1}{16}$	-2
$\frac{1}{4}$	-1
1	0
4	1
16	2



6.  $f(x) = -1 + \log_4(x + 2)$

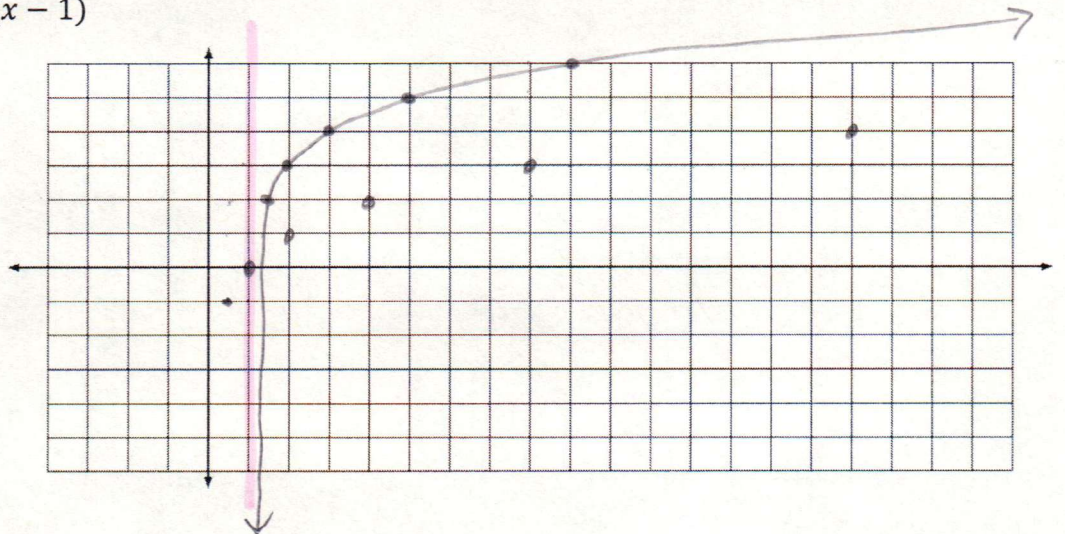
down 1

left 2





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



8. Give the features of the graph in #7.

domain :  $(1, \infty)$

range :  $\mathbb{R}$

x-int :  $(\frac{1}{8}, 0)$

y-int: none

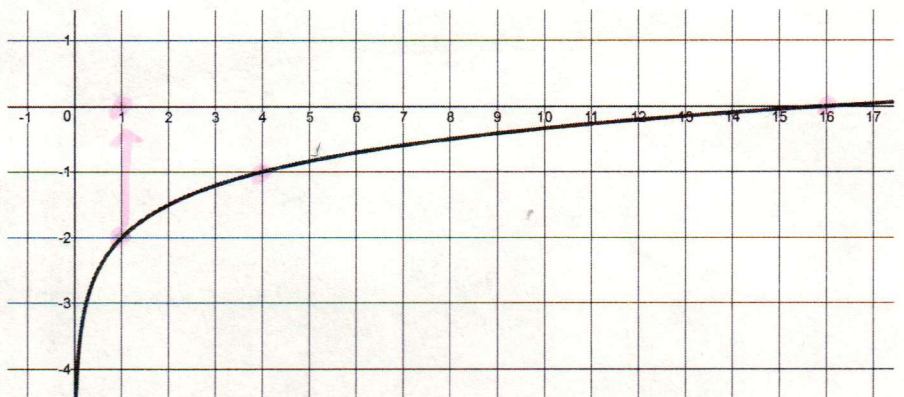
logarithmic

increase :  $(1, \infty)$

Write the equation for each given graph.

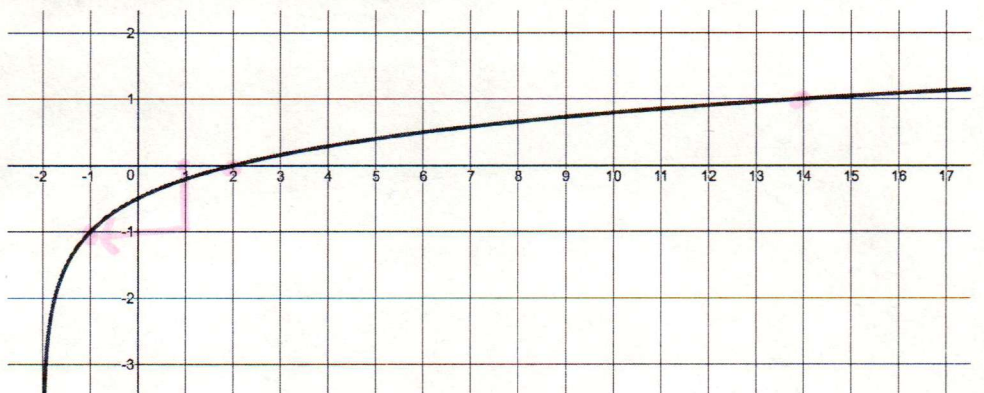
9. Write the equation of the transformation of  $f(x) = \log_4 x$

$f(x) = -2 + \log_4 x$



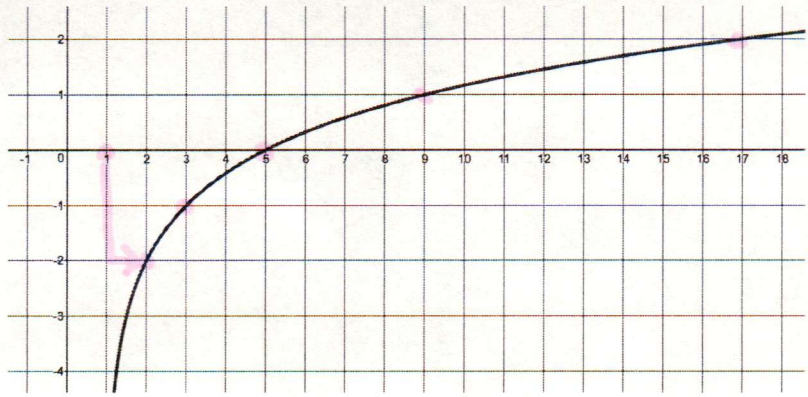
10. Write the equation of the graph.

$f(x) = -1 + \log_4(x + 2)$



11. Write the equation of the graph.

$$f(x) = -2 + \log_2(x-1)$$



Rewrite and simplify each expression using properties of logarithms.

12.  $\log(4xy)$

$$\log 4 + \log x + \log y$$

13.  $\log\left(\frac{6}{x}\right)$

$$\log 6 - \log x$$

14.  $\log(2a^4)$

$$\log 2 + 4 \log a$$

15.  $\log\left(\frac{4}{12x}\right) \Rightarrow \log\left(\frac{1}{3x}\right)$

$$\log 1 - (\log 3 + \log x)$$

$$0 - \log 3 - \log x$$

Solve each equation.

16.  $\log_2(x-1) - \log_2(3x) = 0$

$$\log_2(x-1) = \log_2 3x$$

$$x-1 = 3x$$

$$-1 = 2x$$

$$x = -\frac{1}{2}$$

17.  $\frac{\log 3x}{\log 15} = 1$

$$\log 3x = \log 15$$

$$3x = 15$$

$$x = 5$$

18.  $10^x = 200$

$$\log 200 = x$$

$$x \approx 2.301$$

19.  $10^{x+2} = 410$

$$\log 410 = x+2$$

$$2.613 \approx x+2$$

$$x \approx .613$$



Solve each equation.

20.  $2(10^{x+1}) = 142$

$$10^{x+1} = 71$$

$$\log 71 = x+1$$

$$1.851 \approx x+1$$

$$x \approx .851$$

No Calculator Part

Given:

$$\log 2 \approx 0.3$$

$$\log 3 \approx 0.5$$

$$\log 5 \approx 0.7$$

21.  $-(10^{-x}) = 55$

$$10^{-x} = -55$$

$$\log(-55) = -x$$

No Solution

Using the values given to you and logarithm rules, calculate the value of each logarithm.

1.  $\log 9$

$$\log 3^2$$

$$2(.5)$$

$$x \approx 1$$

2.  $\log 36$

$$\log(2^2 \cdot 3^2)$$

$$2 \log 2 + 2 \log 3$$

$$2(.3) + 2(.5)$$

$$x \approx 1.6$$

3.  $\log \frac{2}{3}$

$$\log 2 - \log 3$$

$$.3 - .5$$

$$x \approx -.2$$

4.  $\log 50$

$$\log(10 \cdot 5)$$

$$\log 10 + \log 5$$

$$1 + .7$$

$$x \approx 1.7$$

5.  $\log 200$

$$\log(2 \cdot 10^2)$$

$$\log 2 + 2 \log 10$$

$$.3 + 2(1)$$

$$x \approx 2.3$$

6.  $\log 0.01 \Rightarrow \log \left(\frac{1}{100}\right)$

$$\log 1 - \log 10^2$$

$$0 - 2$$

$$x = -2$$