Lesson 7: Graphing Logarithmic Functions

Question #1

Reference Q.11410

Given the following table of values for the function

$f(x) = (3)^x + 1$

What would the table of values look like for its inverse logarithmic function?

x	y
-3	28/27
-2	10/9
-1	4/3
0	2
1	4
2	10

Question #2

Reference Q.11411

What is the inverse of the equation:

$f(x) = \frac{1}{3}(4)^x - 2$

Question #3

Reference Q.11412

What is the inverse of the equation:

$f(x) = 6\left(\frac{1}{9}\right)^x + 3$

Question #4

Reference Q.11413

What is the inverse of the equation:

$f(x) = \frac{2}{3}(1.2)^x - 4.2$

Question #5

Reference Q.11415

What is the inverse of the following equation:

$y = \log\left(\frac{x-4}{3}\right)$

Question #6

Reference Q.11426

What is the inverse of the following equation:

$y = 2\log_3(x+5)$

Question #7

Reference Q.11427

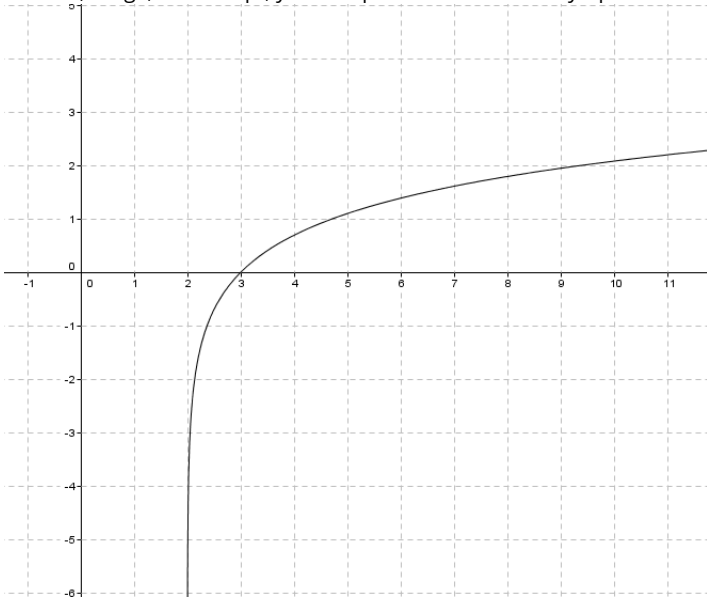
What is the inverse of the following equation:

$y = \frac{1}{2}\log_{0.2}\left(\frac{x+4}{5}\right)$

Question #8

Reference Q.11428

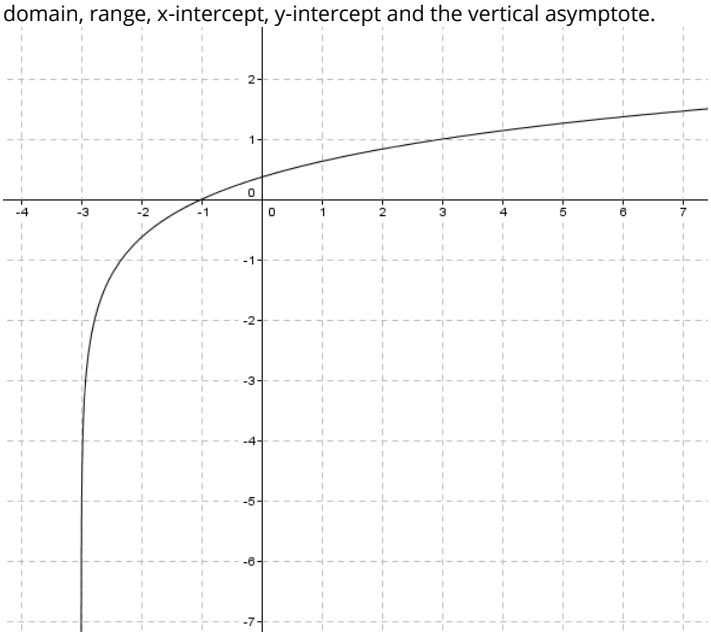
Given the graph of the following logarithmic function, identify the domain, range, x-intercept, y-intercept and the vertical asymptote.



Question #9

Reference Q.11429

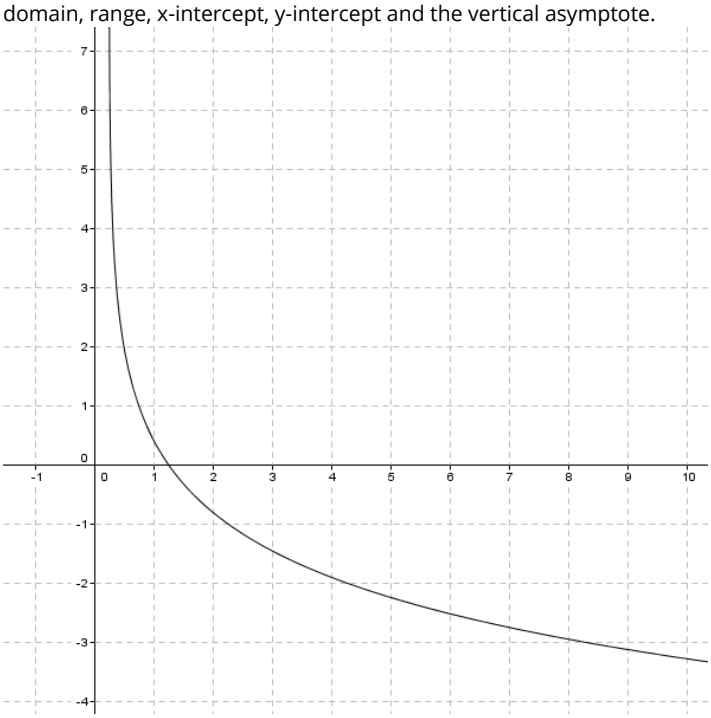
Given the graph of the following logarithmic function, identify the domain, range, x-intercept, y-intercept and the vertical asymptote.



Question #10

Reference Q.11432

Given the graph of the following logarithmic function, identify the domain, range, x-intercept, y-intercept and the vertical asymptote.



Question #11

Reference Q.11433

Using the function $y = 3\log(x-2)$:

a. Sketch using the idea of inverse.

b. Graph the function using transformations.

Question #12

Reference Q.11434

Graph the following function:

$y = 4\log_2(x+3)$

Question #13

Reference Q.11435

Graph the following function:

$y = \log_{0.6}\left(\frac{x-1}{2}\right)$

Question #14

Reference Q.11436

Graph the following function:

$y = \frac{1}{2}\log_{1.5}(x+6)$

Question #15

Reference Q.12752

You invested $20,000 in a guaranteed bond paying 4% per year. An exponential function that represents this growth is $f(t) = 20,000(1.04)^t$. This function represents the current value of the investment as a function of time. The inverse of this function would give the time in years, a function of the value of investment you desired.

a. Find the inverse of $f(x)$.

b. Graph the inverse of $f(x)$.

c. How is this graph helpful?

Question #16

Reference Q.12753

You invested $10,000 in a guaranteed bond paying 5% per year. An exponential function that represents this growth is $f(t) = 10,000(1.05)^t$. This function represents the current value of the investment as a function of time. The inverse of this function would give the time in years, a function of the value of investment you desired.

a. Find the inverse of $f(x)$.

b. Graph the inverse of $f(x)$.

c. How is this graph helpful?

Question #17

Reference Q.11749

a. Complete the following table.

Function	Domain	Range	Asymptote
$f(x) = \log_4 x$			
$f(x) = \log_{\frac{1}{4}} x$			

b. Describe how the graph of $y = \log_4 x$ is related to the graph of $y = \log_{\frac{1}{4}} x$.

c. Hence write $y = \log_{\frac{1}{4}} x$ in the form $y = a \log_4 x$.

Question #18

Reference Q.11750

a. Describe the transformation which maps the graph of $\log_9 x$ to the graph of

ii. $\log_{\frac{1}{9}} x$

iii. $\log_{81} x$

iv. $\log_3 x$

b. Complete the statements

iii. $\log_{\frac{1}{9}} x =$ __ $\log_9 x$

iv. $\log_{81} x =$ __ $\log_9 x$

v. $\log_3 x =$ __ $\log_9 x$

Question #19

Reference Q.11751

a. Describe the transformation which maps the graph of $\log_8 x$ to the graph of

ii. $\log_2 x$

iii. $\log_{64} x$

iv. $\log_{\frac{1}{8}} x$

b. Complete the statements

iii. $\log_2 x =$ __ $\log_8 x$

iv. $\log_{64} x =$ __ $\log_8 x$

v. $\log_{\frac{1}{8}} x =$ __ $\log_8 x$

Question #20

Reference Q.11752

a. If $\log_6 x = 6$, state the values of $\log_{\frac{1}{6}} x, \log_{36} x, \log_{\sqrt{6}} x.$

b. Prove the results in a) by converting to exponential form.

Question #21

Reference Q.11753

Use the following information to answer the next question.

The equations of six logarithmic functions are given below.

$y = \log_b x$, $y = -\log_b x$, $y = \log_{\frac{1}{b}} x$, $y = -\log_{\frac{1}{b}} x$, $y = \log_b\left(\frac{1}{x}\right)$, $y = \log_{\frac{1}{b}}\left(\frac{1}{x}\right)$

When graphed, the six functions can be arranged into two groups of three identical graphs.

Which functions are in each group?

Question #22

Reference Q.11754

Describe how the graphs of the following functions relate to the graph of $y = \log x$.

a. $y = 5 \log x - 2$

b. $\frac{1}{7} y = \log 2(x - 3)$

c. $y = \log \frac{1}{3} x + 1$

d. $y = \log\left(3x + \frac{1}{3}\right)$

Question #23

Reference Q.11755

Complete the following table.

Function	Domain	Range	Asymptote
$f(x) = \log x$			
$f(x) = 5 \log x + 2$			
$f(x) = 5 \log (x + 2)$			
$f(x) = -\log x$			
$f(x) = \log (-x)$			
$f(x) = 2 \log 3(x - 6) - 1$			
$f(x) = \log(3x - 6)$			

Question #24

Reference Q.11756

Consider the graph of the function $f(x) = a \log_c b(x - h) + k$, with $a, b > 0$.

Which of the parameters a, b, c, g, k, affect the

a. domain

b. range

c. asymptote

Question #25

Reference Q.11757

Consider the graph of the function $f(x) = a \log_c b(x - h) + k$, with $a, b > 0$.

a. If a is changed to a negative value, does this affect the domain, range, or asymptote?

b. If b is changed to a negative value, does this affect the domain, range, or asymptote?

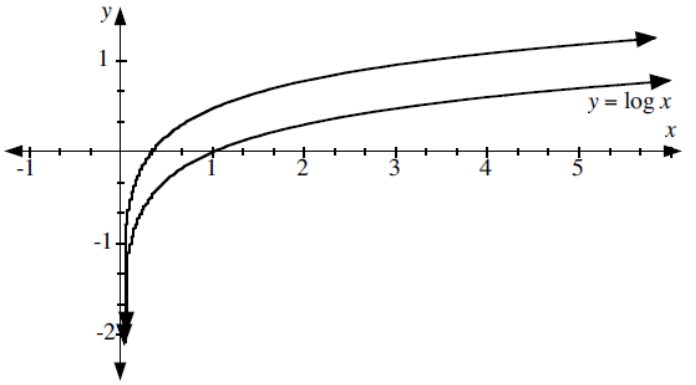
Question #26

Reference Q.11758

Use the following information to answer the question.

Two students, Andy and Holly, were given the following questions on an exam.

"A transformation is applied to the graph of $y = \log x$ and a sketch of both graphs is shown. Write the equation of the graph which represents the transformed image."



a. Andy correctly answered the question with the equation of the transformed image as $y = \log 3x$. Explain from the given sketch how Andy arrived at his solution.

b. Holly also correctly answered the question, but with an equation in the form $y = \log x + k$. Find the value of k.

Question #27

Reference Q.11759

Explain why $2 \log_b x = \log_b x^2$, but the graphs of $2 \log_b x$ and $\log_b x^2$ are not identical.

Question #28

Reference Q.11760

The x-intercept of the graph of the function $f(x) = \log_a (x - d)$ is

A. d
B. $-d$
C. $1 + d$
D. $1 - d$

Question #29

Reference Q.11761

The graph of $y = \log x$ is transformed to the graph of $y = \log(2x + 5)$ by a horizontal stretch about the y-axis by a factor of p followed by a horizontal translation of q units left. The value of $p + q$ is

A. 3
B. 4.5
C. 5.5
D. 7

Question #30

Reference Q.11762

If $\log_6 x = k \log_{216} x$, then the value of k is

(A) 3

(B) -3

(C) $\frac{1}{3}$

(D) 36

Question #31

Reference Q.11763

An equation of the asymptote of $y = 3\log_4(x+2) - 6$ is

(A) $x = -6$

(B) $y = -6$

(C) $x = -2$

(D) $y = -2$

Question #32

Reference Q.11764

If the graph of $\log_7 x$ is reflected in the x-axis, the equation of the image can be written in the form $y = \log_c x$. The value of c, to the nearest hundredth, is ____.

(Record your answer in the numerical response box from left to right.)

Question #33

Reference Q.11765

The graph of $y = \log_5 x$ is translated 2 units down. A student writes the equation of the transformed image in the form $y = \log_5 kx$. The value of k, to the nearest hundredth, is ____ .

(Record your answer in the numerical response box from left to right.)