

**Student:** Cole Lamers  
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**Instructor:** Kelly Galarneau  
**Course:** CA&T Internet (70263)  
Galarneau

**Assignment:** 4.2 Logarithmic Functions

1. A logarithm with base 10 is called the \_\_\_\_\_ logarithm and a logarithm with base e is called the \_\_\_\_\_ logarithm.

A logarithm with base 10 is called the common logarithm and a logarithm with base e is called the natural logarithm.

2. Watch the video and then solve the problem given below.

[Click here to watch the video.](#)<sup>1</sup>

Write the exponential equation  $5^3 = 125$  in logarithmic form.

The exponential equation written as a logarithmic equation is  $\log_5 125 = 3$ .

1: <http://mediaplayer.pearsoncmg.com/assets/Ln1528LugtOCKmcguumzNPj3JhKtGies?clip=1>

3. Write the equation in its equivalent logarithmic form.

$$5^3 = 125$$

What is the equivalent logarithmic form of the equation?

$$3 = \log_5 125$$

4. Convert to a logarithmic equation.

$$2^{-3} = 0.125$$

The equivalent logarithmic equation is

$$\log_2 .125 = -3$$

(Simplify your answers. Type an integer or a decimal.)

5. Watch the video and then solve the problem given below.

[Click here to watch the video.](#)<sup>2</sup>

Write the logarithmic equation  $\log_6 x = 5$  in exponential form.

The logarithmic equation written as an exponential equation is  $6^5 = x$ .

2: <http://mediaplayer.pearsoncmg.com/assets/Ln1528LugtOCKmcguumzNPj3JhKtGies?clip=2>

6. Convert to an exponential equation.

$$\log_5 625 = 4$$

Complete the equivalent exponential equation.

$$5^4 = 625$$

(Type your answer using exponential notation. Do not simplify.)

7. Write in exponential form.

$$\log_5 1 = 0$$

The equivalent exponential form is

$$5^0 = 1$$

(Simplify your answer. Type in exponential form.)

8. Write the following logarithmic equation in exponential form.

**ln** 83 = 4.4188

$e^{4.4188} = 83$  (Type an equation.)

9. Watch the video and then solve the problem given below.

[Click here to watch the video.<sup>3</sup>](#)

Find the value of the logarithm  $\log_{\frac{1}{4}} 64$ .

$\frac{1}{4}$

$\log_{\frac{1}{4}} 64 = \boxed{-3}$ .

3: <http://mediaplayer.pearsoncmg.com/assets/Ln1528LugtOCKmcguumzNPj3JhKtGies?clip=3>

10. Evaluate the expression without using a calculator.

**log** 100

**log** 100 =  $\boxed{2}$

11. Find the logarithm.

**log**  $5 \frac{1}{625}$

**log**  $5 \frac{1}{625} = \boxed{-4}$

12. Find the logarithm.

**log**  $16^2$

**log**  $16^2 = \boxed{\frac{1}{4}}$   
(Type a fraction.)

13. Evaluate the following expression.

**log**  $8^1$

**log**  $8^1 = \boxed{0}$  (Simplify your answer.)

14. Evaluate the following expression.

**log**  $11^{11}$

**log**  $11^{11} = \boxed{1}$  (Simplify your answer.)

15. Evaluate the following expression.

**log**  $9^3$

**log**  $9^3 = \boxed{3}$  (Simplify your answer.)

16. Simplify.

$$\frac{\log_6(1)}{6}$$

$$\frac{\log_6(1)}{6} = \boxed{1}$$

17. Evaluate the following expression.

$$7^{\log_7 9} + \log_3 3^{-3}$$

$$7^{\log_7 9} + \log_3 3^{-3} = \boxed{6} \quad (\text{Simplify your answer.})$$

18. Find the domain of the following function.

$$f(x) = \log_2(x - 6)$$

The domain is  $\boxed{(6, \infty)}$ . (Type your answer in interval notation.)

19. Find the domain of the following function.

$$f(x) = \log_4 \sqrt{x - 8}$$

The domain is  $\boxed{(8, \infty)}$ . (Type your answer in interval notation.)

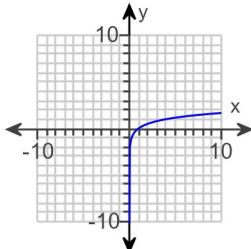
20. Watch the video and then solve the problem given below.

[Click here to watch the video.<sup>4</sup>](#)

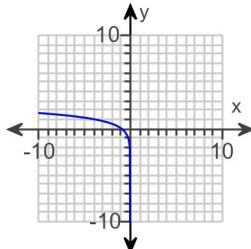
Graph the logarithmic function  $y = \log_4 x$ .

Choose the correct graph below.

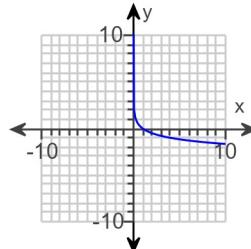
A.



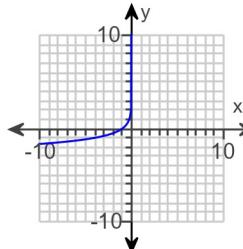
B.



C.



D.



4: <http://mediaplayer.pearsoncmg.com/assets/Ln1528LugtOckmcguumzNPj3JhKtGies?clip=6>

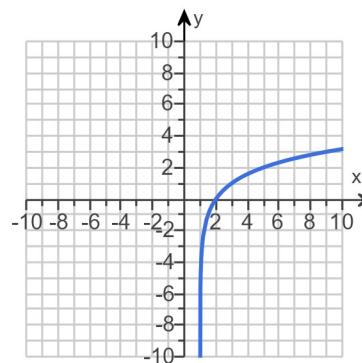
21.

For the following function, briefly describe how the graph can be obtained from the graph of a basic logarithmic function. Then, graph the function and state the domain and the vertical asymptote.

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

Describe how the graph of  $f(x)$  can be obtained from the graph of a basic logarithmic function.

The graph of  $f(x) = \log_2(x - 1)$  could be obtained by translating the graph of  $y = \log_2 x$   unit(s) to the right.



Use the graphing tool to graph the equation.

What is the domain of  $f(x)$ ?

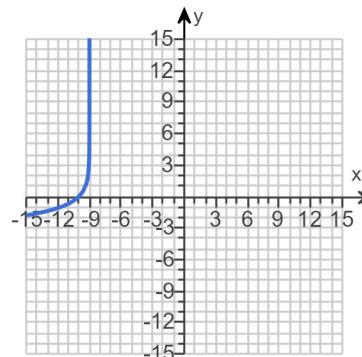
(Type your answer in interval notation.)

The vertical asymptote is  $x =$  .

22.

Begin with the graph of  $y = \ln x$  and use transformations to sketch the graph of the function  $y = -\ln(-9 - x)$ .

Use the graphing tool to graph the equation.

23. Solve for  $x$ .

$$\log x = 2$$

The solution is  $x =$  .

(Simplify your answer. Type an integer or a fraction. Use a comma to separate answers as needed.)