

## Logarithmic Functions

1. Write each equation in its equivalent exponential form.

$$5 = \log_3 x$$

2. Write each equation in its equivalent logarithmic form.

$$5^3 = 125$$

3. Write each equation in its equivalent logarithmic form.

$$\sqrt[4]{16} = 2$$

4. Evaluate each expression without using a calculator

$$\log_5 25$$

5. Evaluate each expression without using a calculator

$$\log_2 \frac{1}{8}$$

6. Evaluate each expression without using a calculator

$$\log_4 \sqrt{4}$$

7. Evaluate each expression without using a calculator

$$\log_9 3$$

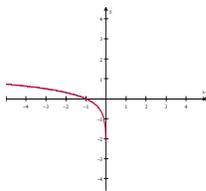
8. Evaluate each expression without using a calculator

$$\log_8 1$$

9. Evaluate each expression without using a calculator

$$3^{\log_3 17}$$

10. The graph of an exponential function is given. Select the function for each graph from the following options:



$$f(x) = \log_9(x)$$

$$g(x) = \log_9(x-1)$$

$$h(x) = \log_9(-x)$$

$$i(x) = \log_9(-x-1)$$

$$j(x) = -\log_9(x)$$

$$k(x) = -\log_9(-x)$$

11. Describe the transformation and graph the function

$$f(x) = \log_4(x-3)$$

12. Describe the transformation and graph the function

$$f(x) = \log x + 3$$

13. Describe the transformation and graph the function

$$f(x) = \ln\left(\frac{1}{3}x\right)$$

14. Find the domain of each logarithmic function

$$f(x) = \log_3(x - 5)$$

15. Find the domain of each logarithmic function

$$f(x) = \ln(x + 3)^2$$

16. Evaluate or simplify each expression without using a calculator

$$\log 10000$$

17. Evaluate or simplify each expression without using a calculator

$$\ln \frac{1}{e^3}$$

18. Evaluate or simplify each expression without using a calculator

$$e^{\ln 9x}$$

19. Evaluate or simplify each expression without using a calculator

$$10^{\log(5x-2)}$$