

**DUE: A-day Tuesday 12/08/15, B-day Monday 12/07/15**

**Pre-Calculus: Lesson 3.2 Logarithmic Functions and their Graphs p. 199 #7-39 odd, #45-49 odd.**

Please complete the assignment using the “tri-fold” method (You may use [www.calcchat.com](http://www.calcchat.com) to check your work):

### ***Procedures and Problem Solving***

**Rewriting Logarithmic Equations** In Exercises 7–14, write the logarithmic equation in exponential form. For example, the exponential form of  $\log_5 25 = 2$  is  $5^2 = 25$ .

7.  $\log_4 64 = 3$

8.  $\log_3 81 = 4$

9.  $\log_7 \frac{1}{49} = -2$

10.  $\log_{10} \frac{1}{1000} = -3$

11.  $\log_{32} 4 = \frac{2}{5}$

12.  $\log_{16} 8 = \frac{3}{4}$

13.  $\log_2 \sqrt{2} = \frac{1}{2}$

14.  $\log_5 \sqrt[3]{25} = \frac{2}{3}$

**Rewriting Exponential Equations** In Exercises 15–22, write the exponential equation in logarithmic form. For example, the logarithmic form of  $2^3 = 8$  is  $\log_2 8 = 3$ .

15.  $5^3 = 125$

16.  $8^2 = 64$

17.  $81^{1/4} = 3$

18.  $9^{3/2} = 27$

19.  $6^{-2} = \frac{1}{36}$

20.  $10^{-3} = 0.001$

21.  $g^a = 4$

22.  $n^t = 10$

**Evaluating Logarithms** In Exercises 23–26, use the definition of logarithmic function to evaluate the function at the indicated value of  $x$  without using a calculator.

<i>Function</i>	<i>Value</i>
✓ 23. $f(x) = \log_2 x$	$x = 16$
24. $f(x) = \log_{16} x$	$x = \frac{1}{4}$
25. $g(x) = \log_{10} x$	$x = \frac{1}{1000}$
26. $g(x) = \log_{10} x$	$x = 10,000$

**Evaluating Common Logarithms on a Calculator** In Exercises 27–30, use a calculator to evaluate the function at the indicated value of  $x$ . Round your result to three decimal places.

<i>Function</i>	<i>Value</i>
✓ 27. $f(x) = \log_{10} x$	$x = 345$
28. $f(x) = \log_{10} x$	$x = \frac{4}{5}$

<i>Function</i>	<i>Value</i>
29. $h(x) = 6 \log_{10} x$	$x = 14.8$
30. $h(x) = 1.9 \log_{10} x$	$x = 4.3$

**Using Properties of Logarithms** In Exercises 31–36, solve the equation for  $x$ .

- ✓ 31.  $\log_7 x = \log_7 9$       32.  $\log_5 5 = x$   
33.  $\log_4 4^2 = x$       34.  $\log_3 3^{-5} = x$   
35.  $\log_8 x = \log_8 10^{-1}$       36.  $\log_4 4^3 = x$

**Using Properties of Logarithms** In Exercises 37–40, use the properties of logarithms to simplify the expression.

37.  $\log_4 4^{3x}$       38.  $6^{\log_6 36}$   
39.  $3 \log_2 \frac{1}{2}$       40.  $\frac{1}{4} \log_4 16$

**Sketching the Graph of a Logarithmic Function** In Exercises 45–50, find the domain, vertical asymptote, and  $x$ -intercept of the logarithmic function, and sketch its graph by hand.

- ✓ 45.  $y = \log_2(x + 2)$       46.  $y = \log_2(x - 1)$   
47.  $y = 1 + \log_2 x$   
48.  $y = 2 - \log_2 x$   
49.  $y = 1 + \log_2(x - 2)$   
50.  $y = 2 + \log_2(x + 1)$