

Math 3 Unit 9 Worksheet 2
Introduction to Logarithms

Name: _____
Date: _____ **Per:** _____

[1-20] Evaluate the following logarithms. If needed, write an equivalent exponential equation. Do these without the use of your calculator.

1. $\log_5 25$

2. $\log_3 81$

3. $\log_4 0.25$

4. $\log_7 \left(\frac{1}{49}\right)$

5. $\log_2 \left(\frac{1}{8}\right)$

6. $\log_3 \sqrt{3}$

7. $\log_5 \sqrt[3]{5}$

8. $\log_9 3$

9. $\log_8 2$

10. $\log_{25} 1$

11. $\log_{\frac{1}{2}} \frac{1}{8}$

12. $\log_9 \left(\frac{1}{3}\right)$

13. $\log 1000$

14. $\log 100,000$

15. $\log 10^8$

16. $\log \left(\frac{1}{10}\right)$

17. $\ln e^4$

18. $\ln 1$

19. $\ln \left(\frac{1}{e^5}\right)$

20. $\ln \sqrt[4]{e}$

[21- 25] Find which two consecutive integers the logarithm lies between.

21. $\log_2 30$

22. $\log_7 9$

23. $\log_4 100$

24. $\log_3 75$

25. $\log_{10} 7500$

[26-28] Find the y-intercept for the following functions.

26. $y = \log_3(x + 9) - 1$

27. $y = \log_2(x + 16) + 3$

28. $y = \log(x + 1) + 4$

Application

In chemistry, the pH of a solution is defined by the equation $\text{pH} = -\log(\text{H})$ where H represents the concentration of hydrogen ions in the solution. Any solution with pH less than 7 is considered acidic and any solution with a pH greater than 7 is considered basic. Fill in the table below. Round your pH's to the nearest thousandth of a unit.

Substance	Concentration of Hydrogen	pH	Basic or Acidic?
Milk	1.6×10^{-7}		
Coffee	1.3×10^{-5}		
Bleach	2.5×10^{-13}		
Lemon Juice	7.9×10^{-2}		
Rain	1.6×10^{-6}		
Egg Whites	1×10^{-8}		

Reasoning

Can the value of $\log_2(-4)$ be found? What about the value of $\log_2 0$? Why or why not? What does this tell you about the domain of $\log_b x$?