

Use the definition of a logarithm to complete the table.

Exponential Form	Logarithmic Form
$2.4^0 = 1$	
$4^{1.5} = 8$	
$10^{-5} = 0.00001$	
	$\log_4 0.0625 = -2$
	$\log_x 8 = 3$
$5^{-2} = \frac{1}{25}$	
	$\log_x \pi = 1$
	$\log 100 = 2$

Evaluate each expression.

1.  $\log 1000$

2.  $\log 10^4$

3.  $\log 1$

4.  $\log \frac{1}{10,000}$

5.  $\log 10^{-3}$

6.  $\log 10$

7.  $\log 0.01$

8.  $\log \frac{1}{1000}$

# When lumberjacks play music, why do they use a large soup can instead of a bass drum?

Match each logarithmic expression with the value of  $x$ .

1. $\log_2 4 = x$	2. $\log_2 x = 3$	3. $\log_4 64 = x$	4. $\log_2 64 = x$
5. $\log_x 81 = 2$	6. $\log_5 x = 2$	7. $\log_x 7 = 1$	8. $\log_4 x = -\frac{1}{2}$
9. $\log_8 x = \frac{1}{3}$	10. $\log_7 x = -1$	11. $\log_{64} x = \frac{1}{2}$	12. $\log_5 x = 4$
13. $\log_3 \frac{1}{3} = x$	14. $\log_x 1000 = 3$	15. $\log_{\frac{5}{2}} \frac{2}{5} = x$	16. $\log_5 1 = x$
17. $\log_x 4 = \frac{2}{3}$	18. $\log_2 \frac{1}{4} = x$	19. $\log_2 x = 0$	20. $\log_8 x = -\frac{2}{3}$
21. $\log_{\frac{1}{2}} x = -1$	22. $\log 10^8 = x$	23. $\log_4 x = 1$	24. $\log_{16} x = \frac{1}{2}$
25. $\log_{13} 169 = x$	26. $\log_x 125 = \frac{3}{4}$	27. $\log_{\sqrt{3}} x = 2$	28. $\log_{\frac{1}{3}} x = -2$
29. $\log_{\frac{9}{3}} \frac{9}{4} = x$	30. $\log_x 0.1 = -1$	31. $\log_{81} x = \frac{1}{4}$	32. $\log_x 5 = \frac{1}{2}$
33. $\log_x \frac{1}{4} = -1$	34. $\log_a 1 = x$	35. $\log_a a = x$	36. $\log_x 0.001 = -3$

## Answers

A. 2	B. 6	C. $\frac{1}{7}$	D. 11	E. 4	F. -4	G. 625	H. 0	I. $\frac{1}{2}$	J. 5
L. 1	M. 3	N. 25	O. 10	R. -1	S. 8	T. -2	U. 7	W. $\frac{1}{4}$	Y. 9

10.	36.	3.	27.	14.	6.

19.	30.	12.	26.	33.	13.

15.	16.	5.	18.	34.	31.	2.

9.	35.	20.	21.	28.	17.	

7.	11.	23.

1.

4.	25.	22.	24.

29.	8.	32.

