Logarithmic Functions and Equations

Log functions, properties of logarithms, inverse relationships, and solving equations.

Name _____ Date _____

32 main · 2-up grid · 2 pages

Completion Reward

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1. What does log_b(a) ask for?

base	exponent	result
2	3	8
10	2	100

log_b(a) asks what exponent on base b produces a.

A. The coefficient on b
B. The square root of a
C. The exponent on b that gives a
D. The remainder after dividing a by b

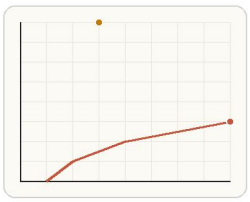
2. Which expression equals log(xy)?

A. log(x) - log(y)
B. log(xy)^2
C. log(x) + log(y)
D. log(x)log(y)

3. Which expression equals log(x / y)?

A. log(x) + log(y)
B. log(xy)
C. log(x) - log(y)
D. log(y) - log(x)

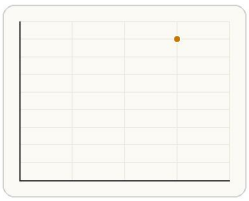
4. Why are logarithms called inverse functions of exponentials?



A logarithm reverses an exponential relationship by solving for the exponent instead of the output.

A. They undo exponential growth statements by solving for the exponent.
B. They always make numbers smaller.
C. They remove the base entirely.
D. They reverse multiplication by turning it into subtraction only.

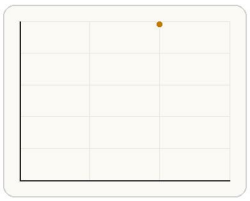
5. Which equation is equivalent to log_2(8) = 3?



A logarithmic equation can be read as an exponential equation with the same base, exponent, and output.

A. 3^2 = 8
B. 8^2 = 3
C. 2^3 = 8
D. 2^8 = 3

6. Which equation matches log_7(49) = 2?



Use the base and output to rewrite the logarithm as the exponential equation it describes.

A. 2^7 = 49
B. 49^2 = 7
C. 7^2 = 49
D. 7^49 = 2

7. What is the best first step to solve log_5(x) = 3?

A. Add 5 to both sides.
B. Square both sides.
C. Replace x with 0.
D. Rewrite it as 5^3 = x.

8. A student says log(xy) = log(x)log(y). What is the mistake?

A. The product rule uses addition, not multiplication.
B. The quotient rule should be used.
C. Logs can never be separated.
D. The rule should multiply by the base first.

9. Evaluate log_10(1000). Answer with a number.

expression	value
10^1	10
10^2	100
10^3	1000

Look for the exponent that makes the target value.

10. Evaluate log_2(16). Answer with a number.

11. If e^x = e^7, what is x? Answer with a number.

12. Evaluate log_5(25). Answer with a number.

13. Solve log_2(x) = 5. Answer with a number.

exponent	2^exponent
3	8
4	16
5	32

Solving log_2(x) = 5 means finding the output paired with exponent 5.

14. Solve log_3(x) = 2. Answer with a number.

15. Evaluate 2log_10(10). Answer with a number.

16. If log_4(64) = x, find x. Answer with a number.

17. Evaluate log_9(81). Answer with a number.

18. Rewrite log_3(81) = 4 in exponential form. Answer as an equation.

19. Rewrite 5^3 = 125 in logarithmic form. Answer as an equation.

20. Expand log(4x). Answer with an equivalent expression.

21. Expand log(x / 7). Answer with an equivalent expression.

22. Condense log(x) + log(y) into one logarithm. Answer as an expression.

23. Condense log(x) - log(y) into one logarithm. Answer as an expression.

24. Solve 2^x = 32. Answer in the form x = ...

25. Solve 3^x = 81. Answer in the form x = ...

26. Expand log(x^3). Answer with an equivalent expression.

27. Condense 4log(x) into one logarithm. Answer as an expression.

28. Solve log_10(x) = 4. Answer in the form x = ...

29. Solve log_2(x) = 6. Answer in the form x = ...

30. Condense log(x) + 2log(y). Answer as an expression.

31. Expand log((x^2) / y). Answer with an equivalent expression.

32. Which expression correctly condenses log(a) + log(b) - log(c)?

A. log(ab / c)
B. log(a + b - c)
C. log(a)log(b) / log(c)
D. log(a / bc)