

Algebra 2 - Logarithms - Worksheet

Common Core F-LE.A.4, F-BF.B.5, F-IF.C.7e · maths-pdf.fr/en/

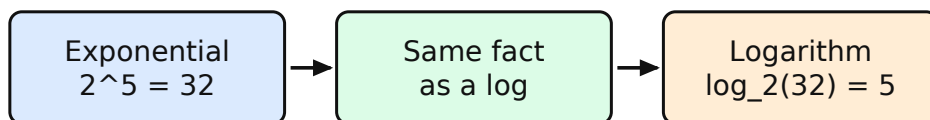
Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice logarithms (Common Core F-LE.A.4, F-BF.B.5 and F-IF.C.7e). The first problems check converting between exponential and logarithmic form, the middle problems add log properties, change of base, and solving exponential and logarithmic equations, and the last six are word problems and multi-step tasks that need doubling time, pH, and earthquake magnitude.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **F-LE.A.4, F-BF.B.5, F-IF.C.7e**

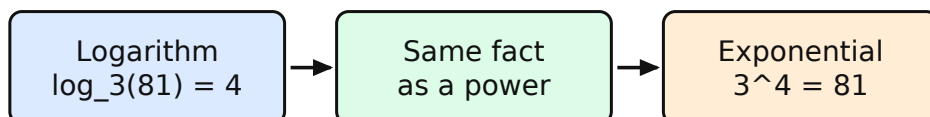
Exercise 1 - Exponential to log



A logarithm is an exponent: $\log_b(x) = y$ means $b^y = x$.

Write $2^5 = 32$ in logarithmic form.

Exercise 2 - Log to exponential



Convert by moving the base.

Write $\log_3(81) = 4$ in exponential form.

Exercise 3 - Evaluate a log

Evaluate $\log_2(64)$.

Exercise 4 - Fractional argument

Evaluate $\log_5(\frac{1}{25})$.

Exercise 5 - Common log

Evaluate $\log 1000$.

Exercise 6 - Root as an exponent

Evaluate $\log_9(3)$.

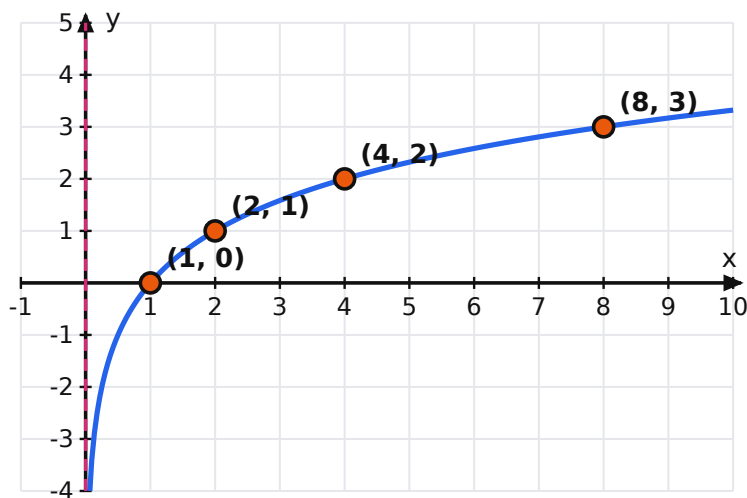
Exercise 7 - Natural log

Evaluate $\ln e^4$ and $\ln 1$.

Exercise 8 - Solve a log equation

Solve $\log_4(x) = 3$.

Exercise 9 - Read the graph



$$y = \log_2 x.$$

The graph of $f(x) = \log_2(x)$ is shown. Find $f(4)$ and $f(8)$, and state the domain and the vertical asymptote.

Exercise 10 - Expand

Expand $\log_3(9x^2)$.

Exercise 11 - Condense

Write $2\log 5 + \log 4$ as one logarithm and evaluate.

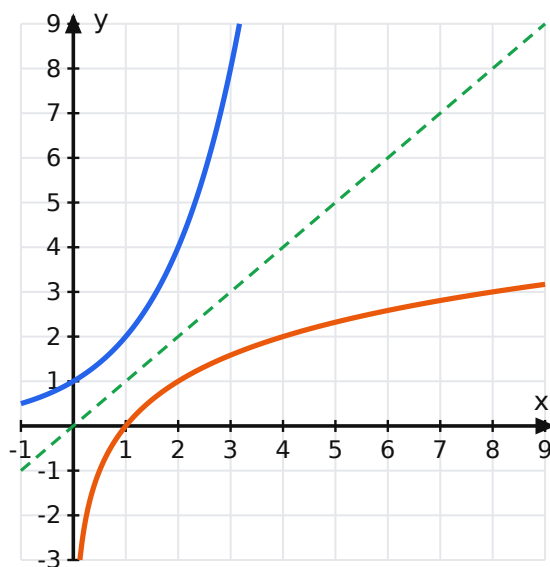
Exercise 12 - Condense a difference

Write $\ln 12 - \ln 3$ as a single logarithm.

Exercise 13 - Change of base

Use the change of base formula to evaluate $\log_2(20)$ to two decimal places.

Exercise 14 - Solve $2^x = 20$



Graphs of 2^x and $\log_2 x$.

Solve $2^x = 20$. Give the exact answer and a decimal to two places.

Exercise 15 - Coefficient in the exponent

Solve $5^{2x} = 100$.

Exercise 16 - Isolate first

Solve $3(2)^x = 48$.

Exercise 17 - Solve a log equation, shifted

Solve $\log_2(x+3)=5$.

Exercise 18 - Extraneous solution

Solve $\log x + \log(x-3)=1$.

Exercise 19 - Doubling time

Years t	10	11	12
$5000(1.06)^t$	8,954	9,491	10,061

Balance at 6%.

Priya invests \$5,000 at 6% compounded annually. How long does it take to double? The table shows balances after 10, 11, and 12 years.

Exercise 20 - pH scale

The pH of a solution is $\text{pH} = -\log[H^+]$, where $[H^+]$ is the hydrogen ion concentration. Find the pH when $[H^+] = 0.001$ and when $[H^+] = 2.5 \times 10^{-5}$.

Exercise 21 - Earthquakes

The magnitude of an earthquake is $M = \log \frac{I}{I_0}$. One earthquake has intensity $10^6 I_0$ and another $10^4 I_0$. Find each magnitude and how many times more intense the first is.

Exercise 22 - Find the error

Mei wrote $\log(x+y) = \log x + \log y$. Test the claim with $x=10$ and $y=10$ and write the correct rule.