

Algebra 2 - Logarithms - Test Answer Key

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

Use this answer key and scoring guide to grade the test on logarithms (F-LE.A.4). Each solution shows the full reasoning, and the scoring note explains how many points to award for correct setup, correct work, and a correct final answer. Partial credit rewards a sound method even when a small arithmetic slip changes the result.

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

Question 1 - Convert forms [2 pts]

a. $\log_3(81) = 4$

b. $5^3 = 125$

(a) $\log_3(81) = 4$; **(b)** $5^3 = 125$

Scoring: 1 point for each conversion.

Question 2 - Evaluate [2 pts]

a. $2^5 = 32$

b. $7^{-1} = \frac{1}{7}$

(a) 5; (b) -1

Scoring: 1 point for each part.

Question 3 - Properties [3 pts]

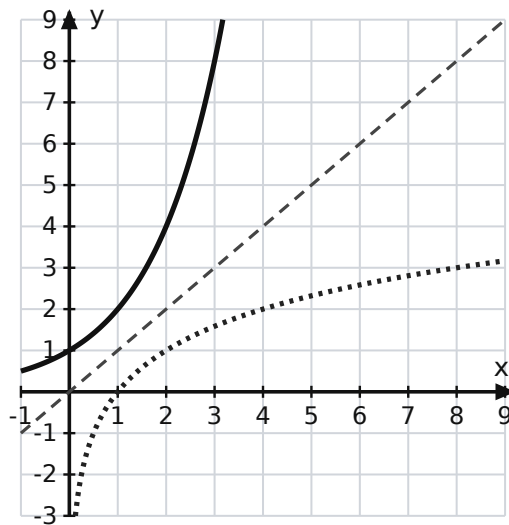
a. $\log_2(8) + \log_2(x^3) = 3 + 3\log_2(x)$

b. $\ln(6 \cdot 5) = \ln 30$

(a) $3 + 3\log_2(x)$; **(b)** $\ln 30$

Scoring: Part (a): 1 point for the product rule, 1 point for the power rule. Part (b): 1 point.

Question 4 - Exponential equation [3 pts]



Graph of 4^x is steeper than 2^x .

$$x = \log_4(50) = \frac{\ln 50}{\ln 4} = \frac{3.9120}{1.3863} \approx 2.82.$$

$$x = \frac{\ln 50}{\ln 4} \approx 2.82$$

Scoring: 1 point for taking logs, 1 point for the exact answer, 1 point for the decimal.

Question 5 - Logarithmic equation [2 pts]

$$2x-1=3^2=9, \text{ so } x=5.$$

$$x=5$$

Scoring: 1 point for the exponential form, 1 point for the solution.

Question 6 - Change of base [2 pts]

$$\frac{\ln 40}{\ln 3} \approx \frac{3.6889}{1.0986} \approx 3.36.$$

About 3.36

Scoring: 1 point for the formula, 1 point for the value.

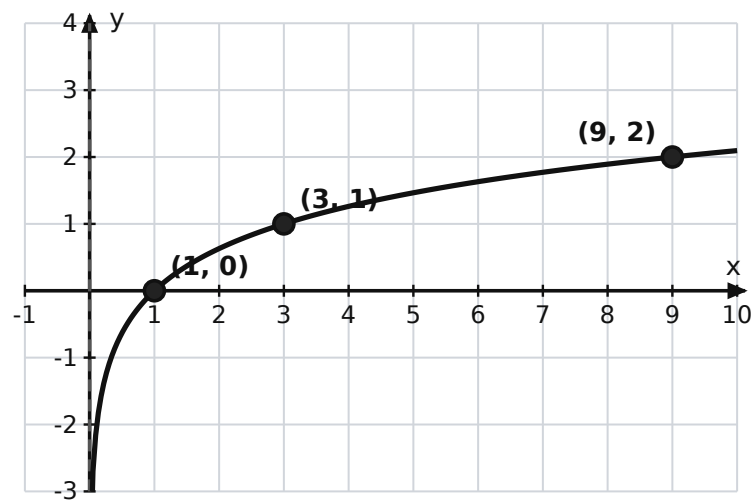
Question 7 - Doubling time [2 pts]

$t = \frac{\ln 2}{\ln 1.04} \approx 17.67$. The balance passes 2 between 17 and 18 years.

About 17.7 years

Scoring: 1 point for the equation and formula, 1 point for the value.

Question 8 - Graph features [2 pts]



Domain $x > 0$.

Only positive inputs have a logarithm. Outputs take every real value.

Domain $x > 0$; range all real numbers; asymptote $x = 0$

Scoring: 1 point for the domain and asymptote, 1 point for the range.

Question 9 - Find the error [2 pts]

At $x = 10$: $2\log 10 = 2$ but $\log 20 \approx 1.301$. The values differ.

By the power rule, $2\log x = \log x^2$.

$2 \log x = \log(x^2)$

Scoring: 1 point for the counterexample, 1 point for the correct rewrite.

Total

20 points