

Algebra 2 · Logarithms and Logarithmic Functions · Test Answer Key

Common Core F-LE.A.4, F-BF.B.4a, F-IF.C.7e · mathovore.fr

Award points as shown in each scoring note. Accept equivalent forms, and give full credit when a decimal answer is rounded as the question requires.

Algebra 2 Common Core: F-LE.A.4 · F-BF.B.4a · F-IF.C.7e

Question 1: Convert forms (2 points)

- a. $\log_5 125 = 3$
- b. $9^{1/2} = 3$

Scoring: 1 point for each correct conversion.

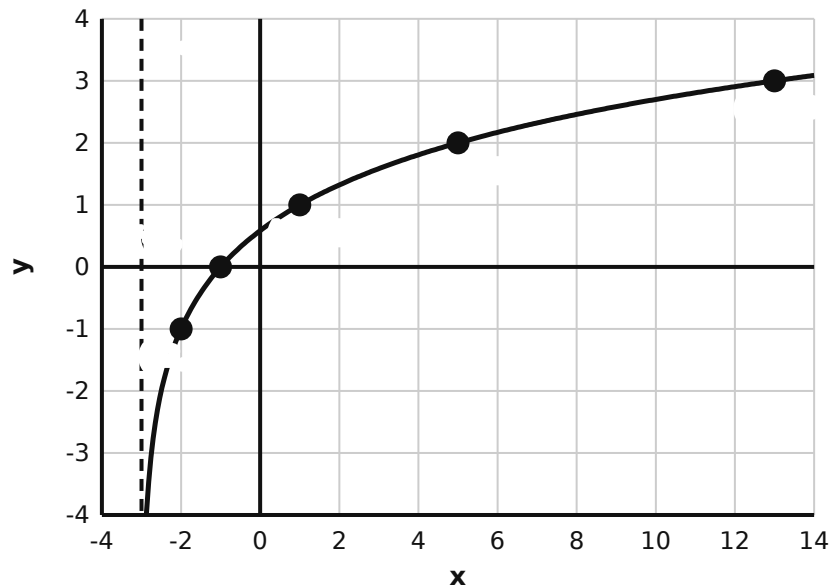
Question 2: Evaluate logs (2 points)

- a. $3^5 = 243$, so **5**
- b. $10^{-4} = 0.0001$, so **-4**

Scoring: 1 point for each correct value.

Question 3: Graph of a logarithm (3 points)

- a. $x = -3$
- b. Domain $x > -3$, range **all real numbers**
- c. $\log_2(x+3) = 1$, so $x+3 = 2$ and $x = -1$



The graph with the asymptote and x-intercept marked.

Scoring: 1 point each for the asymptote, the domain and range together, and the x-intercept.

Question 4: Domain (2 points)

- a. $4x-12>0$, so $x>3$
- b. $7-x>0$, so $x<7$

Scoring: 1 point for each correct domain.

Question 5: Properties of logs (2 points)

- a. $\log_2 8 + 2\log_2 x - \log_2 y = 3 + 2\log_2 x - \log_2 y$
- b. $\log 25 + \log 4 = \log 100 = 2$

Scoring: 1 point for each correct result.

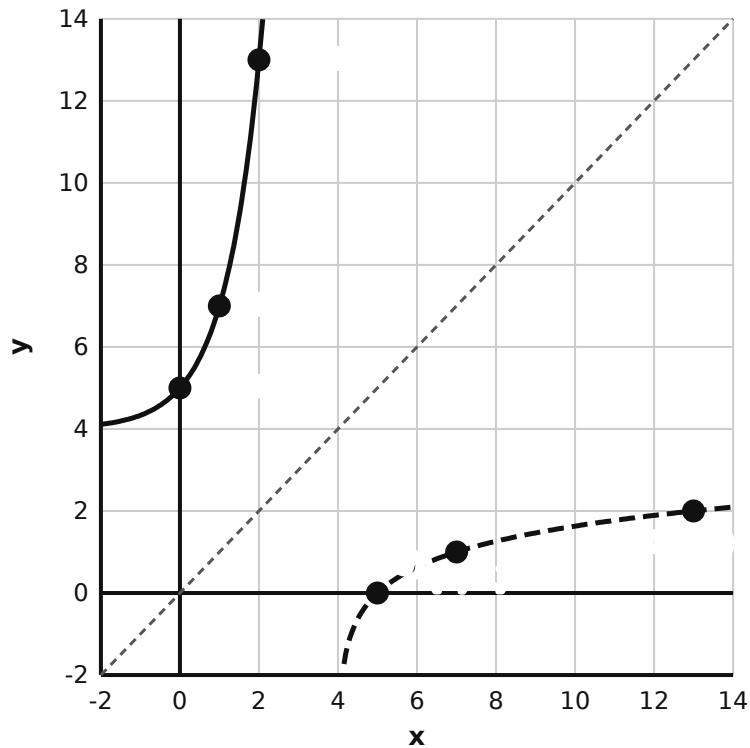
Question 6: Change of base (2 points)

$$\log_7 30 = \frac{\ln 30}{\ln 7} \approx \frac{3.4012}{1.9459} \approx 1.748$$

Scoring: 1 point for a correct quotient of logs, 1 point for the value 1.748.

Question 7: Inverse function (3 points)

- a. $x = 3^y + 4$, so $3^y = x - 4$ and $f^{-1}(x) = \log_3(x - 4)$
- b. $\log_3 27 = 3$



The graph of f and f inverse, mirrored over $y = x$.

Scoring: (a) 1 point for swapping and isolating the power, 1 point for the correct inverse; (b) 1 point.

Question 8: Acidity (2 points)

a. $-\log 0.0063 \approx 2.20$

b. $[H^+] = 10^{-8.4} \approx 3.98 \times 10^{-9} \text{ mol/L}$

Scoring: 1 point for each correct answer.

Question 9: Sound intensity (2 points)

a. $\log \frac{I}{I_0} = 7$, so the ratio is 10^7

b. $L = 10 \log(5 \times 10^8) = 10(8 + 0.699) \approx 87.0 \text{ dB}$

Scoring: 1 point for each correct answer.

Total
20 points