

Precalculus · Exponential and Logarithmic Functions and Models · Quiz

Common Core F-LE.A.4, F-BF.B.5, F-IF.C.8b · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This precalculus exponential log quiz asks 10 multiple-choice questions on exponential and logarithmic functions and models, and each answer comes with a short explanation.

Ten multiple-choice questions on logarithm forms, log laws, exponential and logarithmic equations, logistic models and logarithmic scales. Pick one answer for each question, then read the explanations to learn what each wrong choice gets wrong.

PrecalculusCommon Core: F-LE.A.4 · F-BF.B.5 · F-IF.C.8b

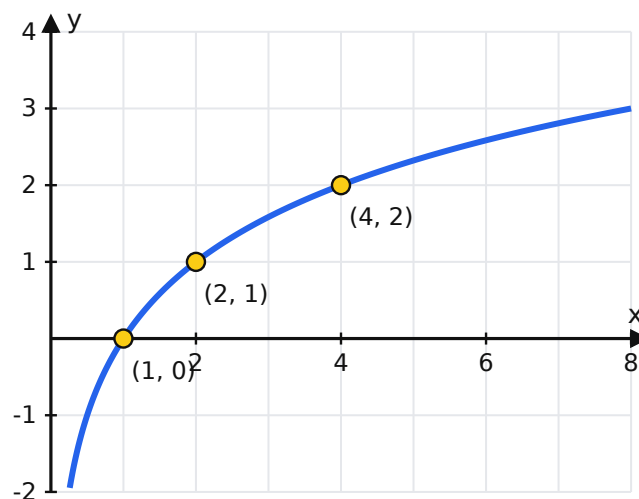
Questions

Question 1

Which equation is the logarithmic form of $4^{3/2} = 8$?

- A. $\log_4 8 = \frac{3}{2}$
- B. $\log_8 4 = \frac{3}{2}$
- C. $\log_{3/2} 8 = 4$
- D. $\log_4 \frac{3}{2} = 8$

Question 2



A curve with three marked points.

Which function has the graph shown?

- A. $y = 2^x$
- B. $y = \log_{1/2} x$
- C. $y = \log_2 x$
- D. $y = \log_2 x + 1$

Question 3

Which expression equals $\ln 3 + \ln 4$?

- A. $\ln 12$
- B. $\ln 7$
- C. $\ln \frac{3}{4}$
- D. $\ln 81$

Question 4

Which expression equals $2\log_b x - \log_b y$?

- A. $\log_b \frac{2x}{y}$
- B. $\log_b \frac{x^2}{y}$
- C. $\log_b (x^2 - y)$
- D. $\log_b (x^2 y)$

Question 5

What is the solution of $5^x = 40$, rounded to two decimal places?

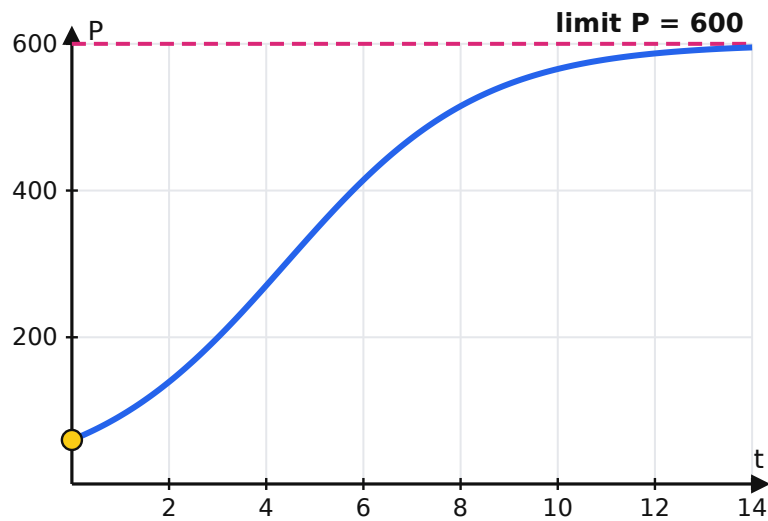
- A. $x = \ln 8 \approx 2.08$
- B. $x = \frac{\ln 40}{5} \approx 0.74$
- C. $x = 5 \ln 40 \approx 18.44$
- D. $x = \frac{\ln 40}{\ln 5} \approx 2.29$

Question 6

Solve $\ln x + \ln(x-3) = \ln 4$.

- A. $x = 4 \text{ only}$
- B. $x = 4 \text{ and } x = -1$
- C. $x = -1 \text{ only}$
- D. $x = 3.5$

Question 7



A population over time, with a dashed horizontal line.

What is the carrying capacity shown by the graph?

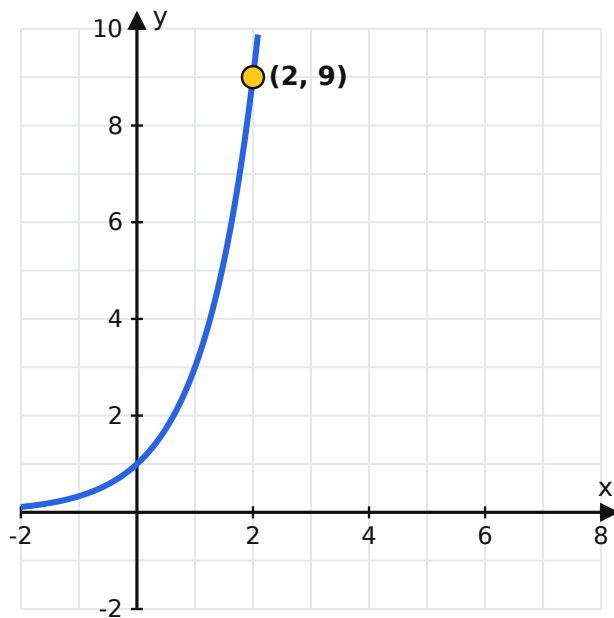
- A. 300
- B. 60
- C. 1,200
- D. 600

Question 8

Money grows continuously at 3% per year. What is the doubling time, to the nearest tenth of a year?

- A. 33.3 years
- B. 23.1 years
- C. 0.04 years
- D. 2.31 years

Question 9



The graph of $f(x) = 3^x$.

The graph of $f(x) = 3^x$ contains the point shown. Which point must be on the graph of f^{-1} ?

- A. (2,9)
- B. (9,2)
- C. (-2,9)
- D. $(\frac{1}{9}, 2)$

Question 10

A sound at 80 dB is how many times as intense as a sound at 60 dB?

- A. 20 times
- B. 10 times
- C. 100 times
- D. 1.33 times

Answer key

1. **A** – The base 4 stays the base and the exponent $3/2$ is the value of the logarithm. Mixing up the base and the argument gives the wrong forms.
2. **C** – The points (1, 0), (2, 1) and (4, 2) satisfy $2^y = x$. The curve through them has the y-axis as a vertical asymptote, so it is a base-2 logarithm.
3. **A** – The sum of logarithms is the logarithm of the product: $3 \cdot 4 = 12$. Adding the inputs is a common error.
4. **B** – The power law moves the 2 up as an exponent, and subtracting logarithms means dividing the arguments.
5. **D** – Taking $\ln$ of both sides gives $x \ln 5 = \ln 40$. Dividing 40 by 5 first, or dividing by 5 instead of by $\ln 5$, is a typical mistake.
6. **A** – Then $x(x-3) = 4$ gives $(x-4)(x+1) = 0$. The value $x = -1$ makes $\ln x$ undefined, so only 4 works.
7. **D** – The curve levels off at the dashed horizontal line, which is the carrying capacity 600. The value 60 is the starting population, and 300 is half the limit.
8. **B** – Solve $e^{0.03t} = 2$ to get $t = \frac{\ln 2}{0.03}$. The wrong choices invert the fraction or forget the natural logarithm.
9. **B** – An inverse swaps the coordinates, so (2, 9) becomes (9, 2). The point (2, 9) is on f itself.
10. **C** – The difference is 20 dB, or 2 steps of 10 dB, so the intensity ratio is $10^2 = 100$. Subtracting or dividing the decibel values is a common error.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- $\log_b x = y$ means $b^y = x$, with $b > 0$, b not equal to 1 and $x > 0$.
- Product, quotient and power laws: $\log(MN) = \log M + \log N$, $\log(M/N) = \log M - \log N$, $\log(M^k) = k \log M$.
- Solve $b^t = c$ with $t = \ln c / \ln b$, and always check log equations for extraneous answers.

- Continuous growth is $A = Pe^{(rt)}$; a logistic model $P = K/(1 + Ae^{(-rt)})$ levels off at K .
- Log scales (pH, decibels, magnitude): a difference of d units means a ratio of 10^d .

How to use this precalculus exponential log quiz

Retake this precalculus exponential log quiz until every answer is right, then move on to the worksheet and the test.

