

Algebra 2 · Solving Exponential and Logarithmic Equations · Test

Common Core F-LE.A.4, A-SSE.B.3c · mathovore.fr

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

This 45-minute test has 9 questions worth 20 points. A calculator is allowed. Show every step, and round only at the end unless a question says otherwise.

Test information

- **Grade:** Algebra 2
- **Chapter:** Solving Exponential and Logarithmic Equations
- **Common Core:** F-LE.A.4, A-SSE.B.3c
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 3 pts; Question 5: 2 pts; Question 6: 2 pts; Question 7: 3 pts; Question 8: 2 pts; Question 9: 2 pts)

Question 1: Common base (2 points)

- Solve $3^{2x-1} = 81$. (1 point)
- Solve $5^{x+2} = \frac{1}{25}$. (1 point)

Question 2: Solve with logarithms (2 points)

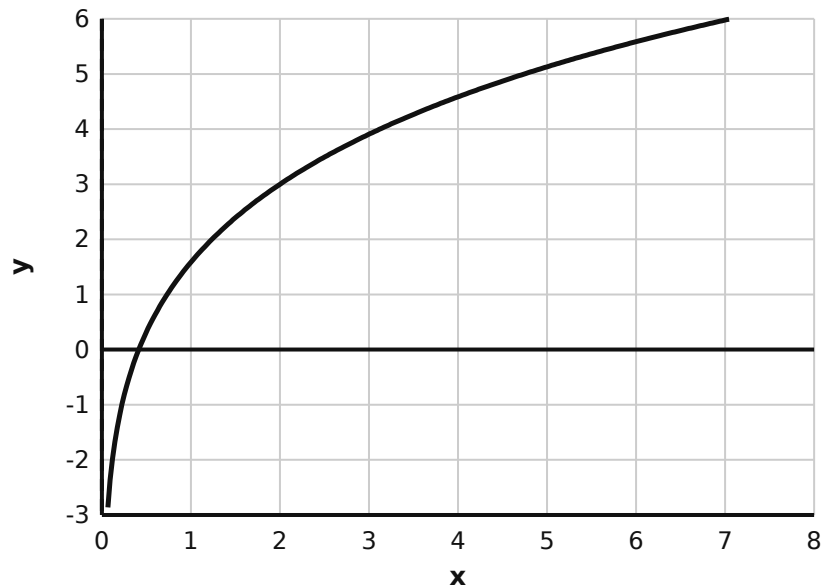
- Solve $6^x = 90$. Round to three decimal places. (1 point)
- Solve $e^{0.4x} = 14$. Round to three decimal places. (1 point)

Question 3: Logarithmic equations (2 points)

- Solve $\log_3(2x+1) = 4$. (1 point)
- Solve $\ln(x-2) = 1.5$. Round to three decimal places. (1 point)

Question 4: Combine logarithms (3 points)

Solve $\log_2 x + \log_2(x+2) = 3$. The graph of the left side is shown with the line $y = 3$.



The curve $y = \log_2 x + \log_2 (x + 2)$.

- Write the equation without logarithms. (1 point)
- Solve the equation. (1 point)
- Identify any extraneous solution and explain why. (1 point)

Question 5: Quotient of logarithms (2 points)

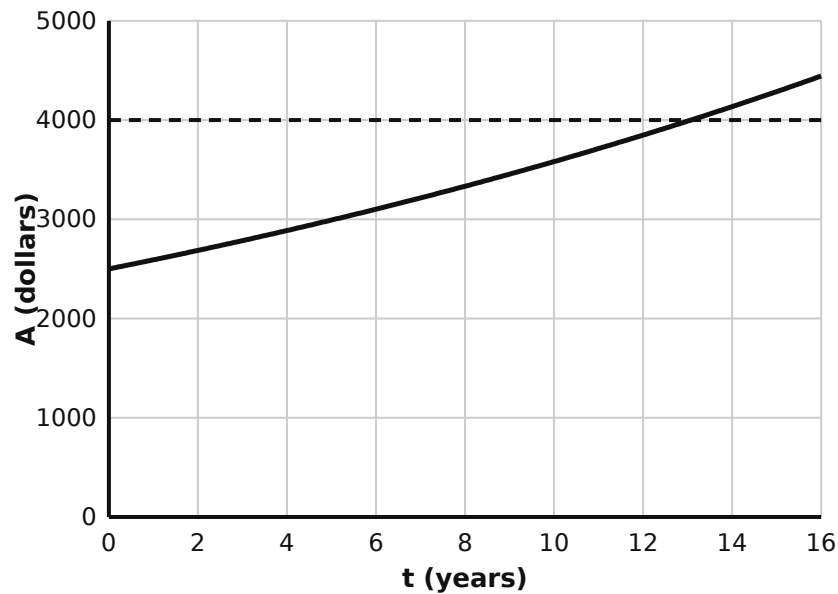
Solve $\log_5(3x+2) - \log_5 x = 1$.

Question 6: Quadratic form (2 points)

Solve $3^{2x} - 10 \cdot 3^x + 9 = 0$.

Question 7: Compound interest (3 points)

Priya deposits \\$2,500 at 3.6% compounded monthly. The balance is $A = 2500 \left(1 + \frac{0.036}{12}\right)^{12t}$ after t years.

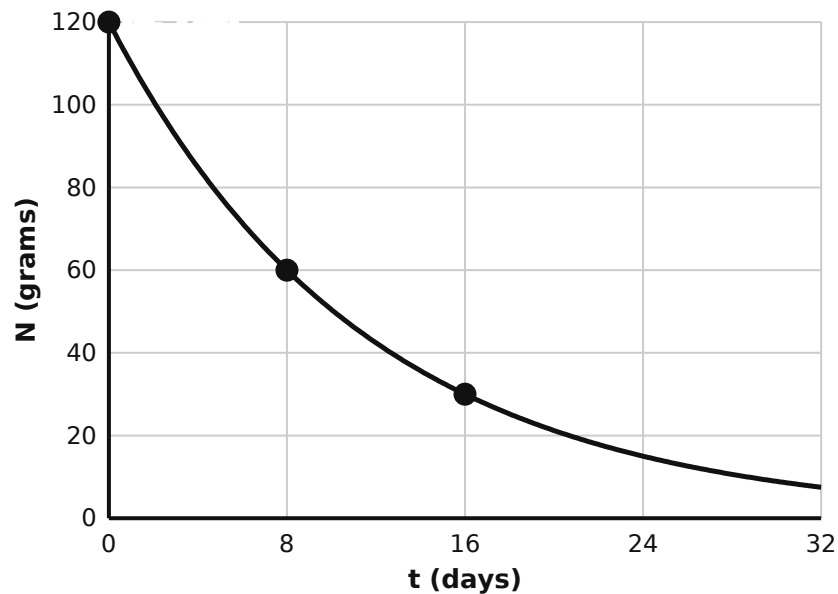


Account balance and the target of \$4,000.

- Write the equation for the time when the balance is \$4,000. (1 point)
- Solve it. Round to the nearest hundredth of a year. (2 points)

Question 8: Half-life (2 points)

A 120 g sample of iodine-131 has half-life 8 days, so $N(t) = 120\left(\frac{1}{2}\right)^{t/8}$.



A 120 g sample with half-life 8 days.

- When do 15 g remain? (1 point)
- When do 40 g remain? Round to the nearest hundredth of a day. (1 point)

Question 9: Equivalent forms (2 points)

A balance grows as $P(t) = 800(1.06)^t$. (a) Write P as $800e^{kt}$ and give k to four decimal places. (1 point) (b) Find the equivalent monthly growth rate as a percent to three decimal places. (1 point)