

Algebra 2 · Solving Exponential and Logarithmic Equations · Test Answer Key

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

This algebra 2 exponential test answer key gives the full solution and the scoring guide for each of the 9 test questions on solving exponential and logarithmic equations.

Award points as shown in each scoring note. Accept answers that differ in the last decimal place because of rounding, and accept equivalent exact forms.

Algebra 2 Common Core: F-LE.A.4 · A-SSE.B.3c

Algebra 2 Exponential Test Answer Key: questions 1-5

Question 1: Common base (2 points)

- a. $3^{2x-1} = 3^4$, $2x-1=4$, so $x = \frac{5}{2}$
- b. $5^{x+2} = 5^{-2}$, $x+2 = -2$, so $x = -4$

Scoring: 1 point for each correct solution.

Question 2: Solve with logarithms (2 points)

- a. $x = \frac{\ln 90}{\ln 6} \approx \frac{4.4998}{1.7918} \approx 2.511$
- b. $0.4x = \ln 14 \approx 2.6391$, so $x \approx 6.598$

Scoring: 1 point for each correct decimal.

Question 3: Logarithmic equations (2 points)

- a. $2x+1 = 3^4 = 81$, so $x = 40$
- b. $x-2 = e^{1.5} \approx 4.4817$, so $x \approx 6.482$

Scoring: 1 point for each correct solution.

Question 4: Combine logarithms (3 points)

- a. $\log_2(x(x+2)) = 3$, so $x(x+2) = 8$.
- b. $x^2+2x-8=0$, $(x+4)(x-2)=0$, so $x=2$ (check: $1+2=3$).
- c. $x=-4$ is extraneous because $\log_2(-4)$ is undefined.

Scoring: 1 point for each part.

Question 5: Quotient of logarithms (2 points)

$\log_5 \frac{3x+2}{x} = 1$, so $\frac{3x+2}{x} = 5$, $3x+2=5x$, and $x=1$. Check: $\log_5 5 - \log_5 1 = 1$.

Scoring: 1 point for combining into one log and rewriting; 1 point for the solution.

Algebra 2 Exponential Test Answer Key: questions 6-9

Question 6: Quadratic form (2 points)

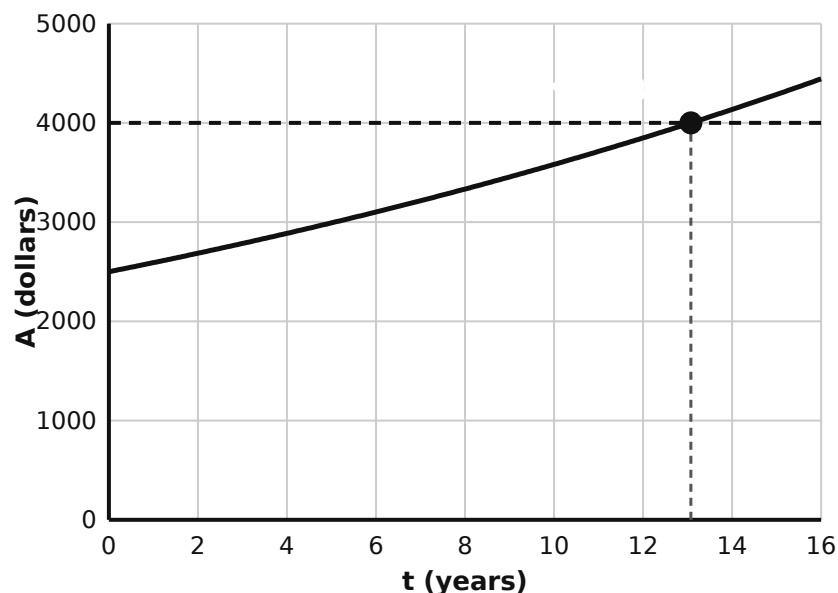
Let $u=3^x$: $u^2-10u+9=0$, $(u-1)(u-9)=0$. So $3^x=1$ gives $x=0$ and $3^x=9$ gives $x=2$. $x=0$ or $x=2$

Scoring: 1 point for the factored quadratic in u ; 1 point for both values of x .

Question 7: Compound interest (3 points)

a. $2500(1.003)^{12t} = 4000$

b. $1.003^{12t} = 1.6$, $12t = \frac{\ln 1.6}{\ln 1.003} \approx \frac{0.4700}{0.002996} \approx 156.9$, so $t \approx 13.08$ years



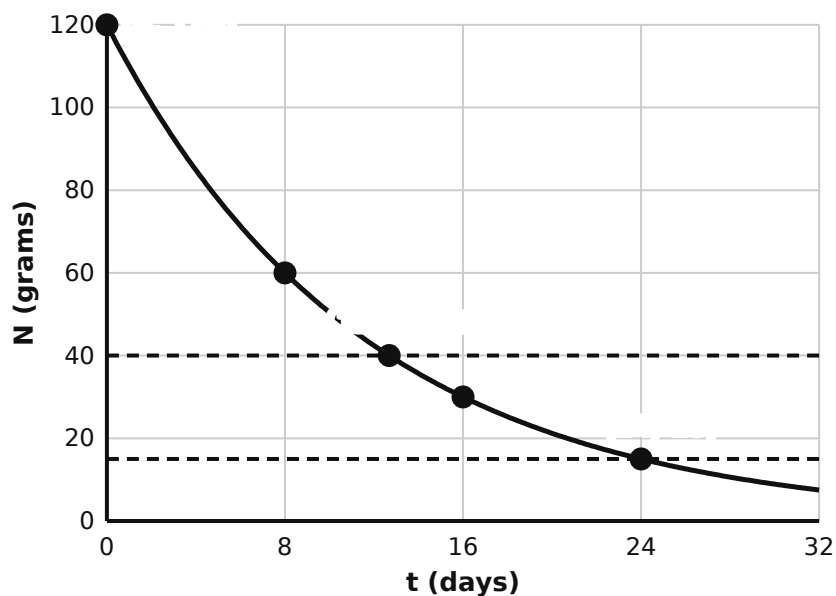
Account balance and the target of \$4,000.

Scoring: (a) 1 point; (b) 1 point for isolating the power and logging, 1 point for the value.

Question 8: Half-life (2 points)

a. $\left(\frac{1}{2}\right)^{t/8} = \frac{1}{8}$, so $\frac{t}{8} = 3$ and $t = 24$ days

b. $\left(\frac{1}{2}\right)^{t/8} = \frac{1}{3}$, $\frac{t}{8} = \log_2 3 \approx 1.585$, so $t \approx 12.68$ days



A 120 g sample with half-life 8 days.

Scoring: 1 point for each correct time.

Question 9: Equivalent forms (2 points)

a. $1.06^t = e^{t \ln 1.06}$, so $k = \ln 1.06 \approx 0.0583$

b. $1.06^{1/12} \approx 1.004868$, so **0.487%** per month

Scoring: 1 point for each part.

Scoring summary

Total

20 points: add the points of every question of this algebra 2 exponential test answer key.

How to use this algebra 2 exponential test answer key

Use this algebra 2 exponential test answer key to score the test fairly and to see which skills need more practice.

