

Algebra 2 - Exponential Growth and Decay - Test Answer Key

Common Core F-LE.A.2, F-LE.B.5, A-SSE.B.3c, F-IF.C.8b · maths-pdf.fr/en/

Use this answer key and scoring guide to grade the test on exponential growth and decay (F-LE.A.2). 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.2, F-LE.B.5, A-SSE.B.3c, F-IF.C.8b**

Question 1 - Identify and evaluate [2 pts]

$b = 0.5 < 1$: decay. $f(3) = 6(0.125) = 0.75$.

Decay; $f(3) = 0.75$

Scoring: 1 point for the classification, 1 point for $f(3)$.

Question 2 - Table to function [3 pts]

Initial value 4, ratio $12 \div 4 = 3$. So $f(x) = 4 \cdot 3^x$.

$f(5) = 4 \cdot 243 = 972$.

$f(x) = 4 \cdot 3^x$; $f(5) = 972$

Scoring: 1 point for the initial value, 1 point for the growth factor, 1 point for $f(5)$.

Question 3 - Percent growth [2 pts]

$P(t) = 8000(1.06)^t$. $P(3) = 8000(1.191016) \approx 9,528$.

About 9,528 people

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

Question 4 - Compound interest [3 pts]

a. $3000(1.06)^4 \approx 3,787.43$

b. $3000(1.015)^{16} \approx 3,806.96$

(a) \$3,787.43; (b) \$3,806.96

Scoring: 1 point for each formula setup, 1 point for the correct values.

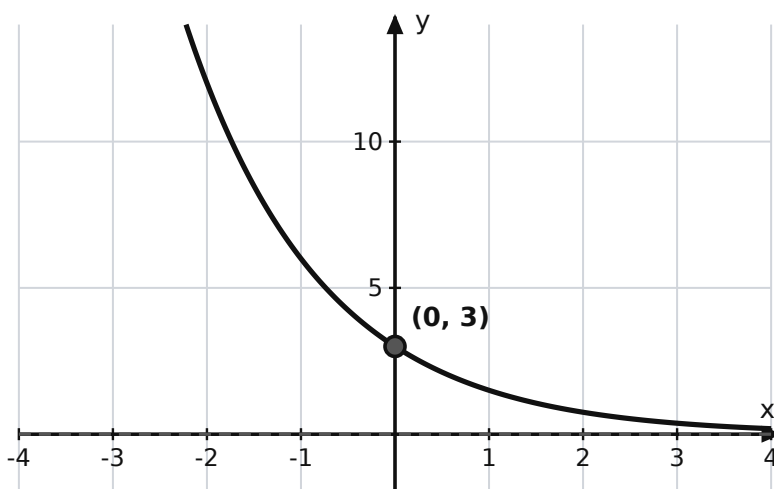
Question 5 - Half-life [2 pts]

15 years is 3 half-lives: $200\left(\frac{1}{2}\right)^3 = 25$.

25 g

Scoring: 1 point for the number of half-lives, 1 point for the amount.

Question 6 - Graph features [2 pts]



Intercept (0, 3).

$f(0) = 3$. As x increases, $f(x)$ approaches 0.

y-intercept (0, 3); asymptote $y = 0$; decreases toward 0

Scoring: 1 point for the intercept, 1 point for the asymptote and end behavior.

Question 7 - Equivalent rate [2 pts]

$$1.005^{12t} = (1.005^{12})^t. \quad 1.005^{12} \approx 1.0617.$$

About 6.2% per year

Scoring: 1 point for rewriting, 1 point for the rate.

Question 8 - Linear versus exponential [2 pts]

Week	4	5	6
A	220	250	280
B	160	320	640

Plan values.

Week 4: $A = 220$, $B = 160$. Week 5: $A = 250$, $B = 320$.

Week 5

Scoring: 1 point for the comparison, 1 point for the week.

Question 9 - Find the error [2 pts]

$b = 0.9 = 1 - 0.10$, so the decay rate is 10% per step.

10% decay

Scoring: 1 point for the explanation, 1 point for the rate.

Total

20 points