

Algebra 1 - Exponential Functions and Growth - Test Answer Key

Common Core F-LE.A.1, F-LE.A.2, F-LE.A.3, F-IF.C.7e, F-IF.C.8b · maths-pdf.fr/en/

Use this key to grade the exponential functions test. Each solution shows the full work, and the scoring note explains how the points are awarded. The test totals 20 points. Give partial credit for correct steps, even when the final answer is wrong.

Algebra 1 · Common Core State Standards: **F-LE.A.1, F-LE.A.2, F-LE.A.3, F-IF.C.7e, F-IF.C.8b**

Question 1 - Growth or decay [2 pts]

a) $b = 1.3 > 1$: growth of 30%.

b) $b = 0.6 < 1$: decay of 40%.

a) growth, 30%; b) decay, 40%

Scoring: 1 point for each part.

Question 2 - Evaluate [2 pts]

$$f(4) = 5 \cdot 16 = 80.$$

$$f(-1) = 5 \cdot 2^{-1} = 5 \cdot \frac{1}{2} = 2.5.$$

80; 2.5

Scoring: 1 point for each value.

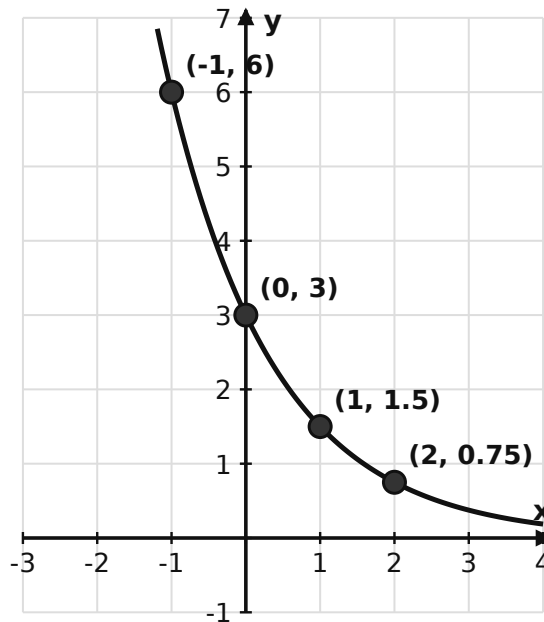
Question 3 - Write from a table [2 pts]

The starting value is 3 and the ratio is $\frac{6}{3} = 2$, $\frac{12}{6} = 2$.

$$y = 3 \cdot 2^x$$

Scoring: 1 point for the starting value; 1 point for the factor and equation.

Question 4 - Graph a decay function [2 pts]



Decay curve with y-intercept 3.

Values: 6,3,1.5,0.75 . Plot them and draw a smooth decreasing curve.

Scoring: 1 point for correct values; 1 point for a correct curve.

Question 5 - Savings growth [2 pts]

a) $A = 500(1.08)^t$.

b) $500(1.08)^3 = 500(1.259712) = 629.856 \approx 629.86$.

$A = 500(1.08)^t$; **\$629.86**

Scoring: 1 point for the model; 1 point for the amount.

Question 6 - Solve [2 pts]

a) $125 = 5^3$, so $x = 3$.

b) $16 = 2^4$, so $x+1 = 4$ and $x = 3$.

$x = 3$; $x = 3$

Scoring: 1 point for each part.

Question 7 - Car depreciation [3 pts]

a) $1 - 0.9 = 0.1$: 10% per year.

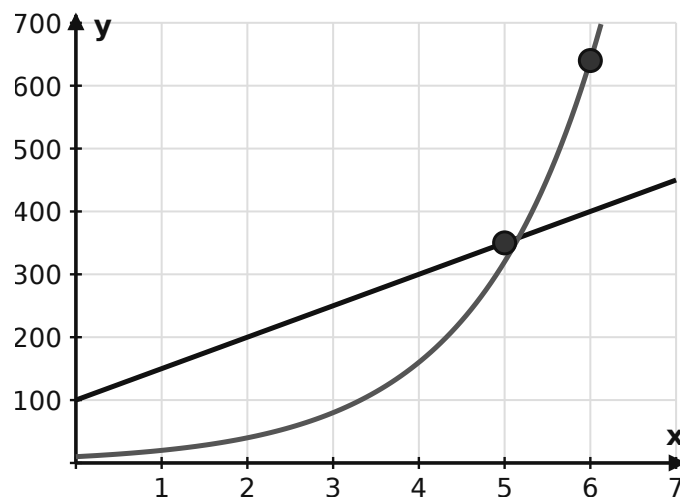
b) $30000(0.9)^4 = 30000(0.6561) = 19683$.

c) After 3 years: $30000(0.9)^3 = 21870$. After 4 years: 19,683, which is below 20,000.

10%; \$19,683; year 4

Scoring: 1 point per part.

Question 8 - Linear versus exponential [3 pts]



Plan B passes Plan A between weeks 5 and 6.

a) Week 5: A has \$350 and B has \$320, so Plan A.

b) Week 6: A has \$400 and B has \$640, so Plan B.

c) Plan A adds a fixed \$50 each week, but Plan B multiplies by 2, so the amount it adds keeps growing and soon exceeds \$50.

Plan A; Plan B; B multiplies

Scoring: 1 point per part.

Question 9 - Half-life [2 pts]

$$A = 120\left(\frac{1}{2}\right)^{t/4}.$$

For $t = 12$: $120\left(\frac{1}{2}\right)^3 = 120 \cdot \frac{1}{8} = 15.$

15 mg

Scoring: 1 point for the model; 1 point for the amount.

Total
20 points