

Algebra 1 · Exponential Growth and Decay · Test

Common Core F-LE.A.1a, F-LE.A.1c, F-LE.A.2, F-LE.A.3, F-IF.C.8b, F-LE.B.5 · mathovore.fr

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

This test covers exponential growth and decay in Algebra 1: linear and exponential tables, factors and percent rates, graphs, compound interest and interpreting parameters (F-LE and F-IF.C.8b). Eight questions are worth 20 points in total. Show every step, and round money to the nearest cent unless told otherwise.

Test information

- **Grade:** Algebra 1
- **Chapter:** Exponential Growth and Decay
- **Common Core:** F-LE.A.1a, F-LE.A.1c, F-LE.A.2, F-LE.A.3, F-IF.C.8b, F-LE.B.5
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 3 pts; Question 5: 3 pts; Question 6: 3 pts; Question 7: 3 pts; Question 8: 2 pts)

Question 1: Table to equation (2 points)

The table shows an exponential function.

x	0	1	2	3	4
y	3	6	12	24	48

Table of values.

- Find the constant factor. (1 point)
- Write the function in the form $y = a \cdot b^x$. (1 point)

Question 2: Classify tables (2 points)

Tell whether each table is linear or exponential. Justify with the difference or factor.

- a. $x=1,2,3,4$ and $y=5,10,15,20$ (1 point)
- b. $x=1,2,3,4$ and $y=4,12,36,108$ (1 point)

Question 3: Growth and decay rates (2 points)

Give the starting value and the yearly percent change.

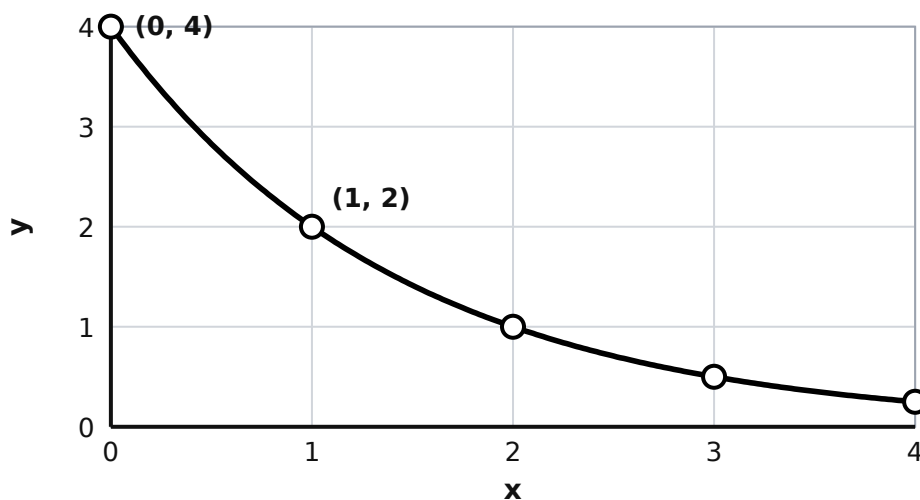
- a. $y=1500(1.06)^t$ (1 point)
- b. $y=60(0.75)^t$ (1 point)

Question 4: Write and use exponential models (3 points)

- (a) A town of 8,000 people grows 2.5% per year. Write a function $P(t)$ for the population after t years. (1 point)
- (b) Use it to find the population after 10 years, to the nearest whole person. (1 point)
- (c) A car worth \$18,000 loses 12% of its value each year. Write a function $V(t)$ for its value. (1 point)

Question 5: Reading an exponential graph (3 points)

The graph shows an exponential function.



A decaying exponential graph.

- a. State a and b . (1 point)
- b. Write the equation. (1 point)
- c. What happens to y as x gets larger? (1 point)

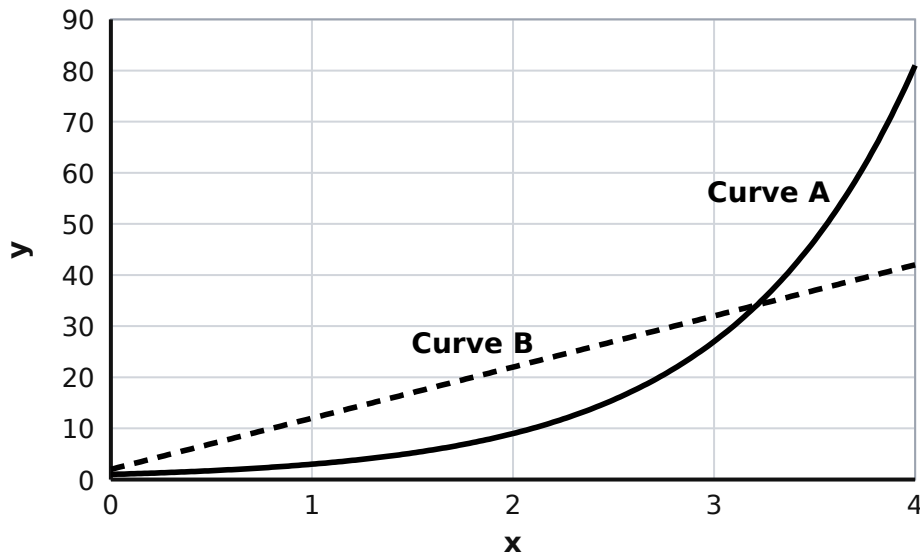
Question 6: Compound interest (3 points)

Maya deposits \$3,000 in an account that pays 4% interest compounded quarterly. The formula is $A = P\left(1 + \frac{r}{n}\right)^{nt}$.

- Substitute the values for 2 years. (1 point)
- Find the balance after 2 years, to the nearest cent. (1 point)
- How much interest does the account earn? (1 point)

Question 7: Exponential versus linear (3 points)

Curve A is $y = 3^x$ and Curve B is $y = 10x + 2$. The graph shows both.



Two curves, A and B.

- Which curve is the exponential function? Give a reason. (1 point)
- For which whole number x does the exponential first have the greater value? Show the values. (1 point)
- Explain why the exponential stays above the line for all larger x . (1 point)

Question 8: Interpret a model (2 points)

A channel's subscriber count is $S(t) = 1200(1.15)^t$, where t is the number of months since launch.

- Explain what 1200 and 1.15 mean in this situation. (1 point)
- Find the subscribers after 3 months, to the nearest whole number. (1 point)