

Exponential Growth and Decay Models

Grade 9 – Algebra 1 math · Test · Standards: F-LE.A.1a, F-LE.A.1c, F-LE.A.2, F-LE.A.3, F-IF.C.8b, F-LE.B.5

Name: _____ Date: _____ Class: _____

This test has 9 questions worth 20 points. Allow 45 minutes and work without notes. Calculators are allowed for powers. Show each step, because partial credit is given for correct setups and values.

Standards: F-LE.A.1a, F-LE.A.1c, F-LE.A.2, F-LE.A.3, F-IF.C.8b, F-LE.B.5 · **Level:** Grade 9 Algebra 1

Time: 45 minutes · 9 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Classify and Write the Rule (2 points)

For each table, state whether it is linear or exponential and write an equation.

x	0	1	2	3
y	6	18	54	162

a. (1 point)

x	0	1	2	3
y	14	21	28	35

b. (1 point)

Question 2 Growth or Decay? (2 points)

State whether each function shows growth or decay, and give the percent rate.

a. $f(x) = 900(0.93)^x$ (1 point)

b. $g(x) = 0.5(1.25)^x$ (1 point)

Question 3 Evaluate a Decay Function (2 points)

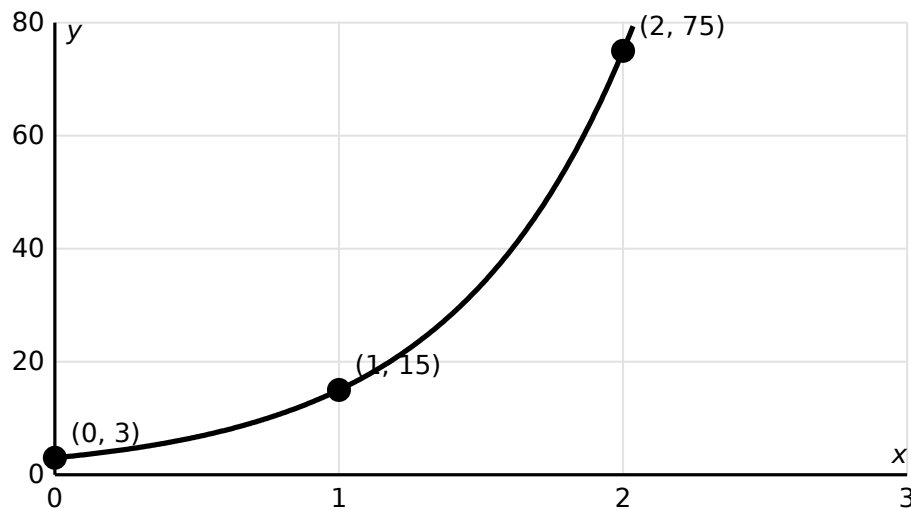
Let $f(x) = 64(0.75)^x$.

a. Find $f(0)$ and $f(2)$. (1 point)

b. Find $f(3)$. (1 point)

Question 4 Equation from a Graph (3 points)

The graph shows points of an exponential function $y = a \cdot b^x$.



Points of an exponential function.

- Find a and b . (1 point)
- Write the equation. (1 point)
- Find y when $x = 3$. (1 point)

Question 5 Compound Interest (2 points)

Calculate the balance when \$3,500 is invested at 5% interest compounded annually for 4 years. Round to the nearest cent.

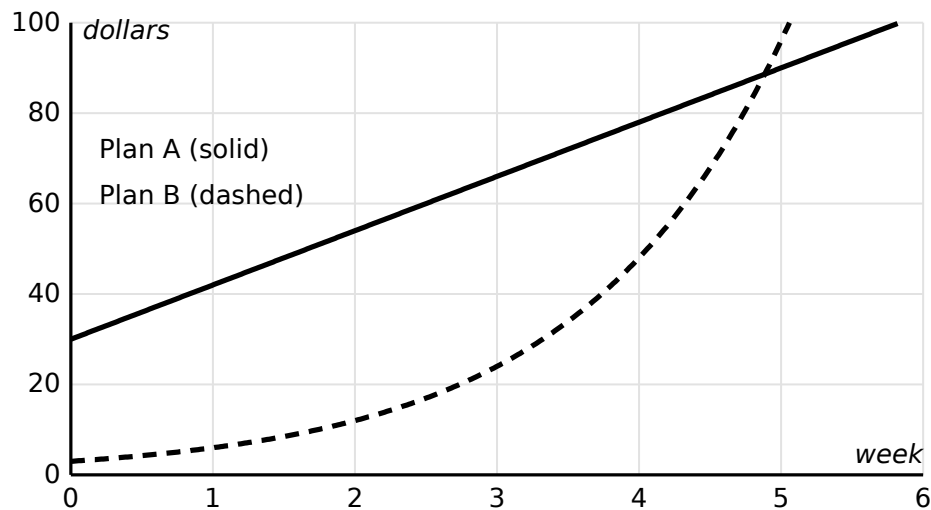
Question 6 A Tablet Loses Value (2 points)

A tablet costs \$720 and loses 15% of its value each year.

- Write a function for its value after t years. (1 point)
- Find its value after 2 years. (1 point)

Question 7 Two Plans Compared (3 points)

A gym offers two plans. Plan A costs $A(w) = 30 + 12w$ dollars after w weeks. Plan B costs $B(w) = 3(2)^w$ dollars after w weeks. The graph shows both.



Two plans over six weeks.

- Which plan costs more after 4 weeks? (1 point)
- Find the first whole week when Plan B costs more than Plan A. Show values. (2 points)

Question 8 Interpret a Mold Model (2 points)

Mold on a slice of bread covers an area of $A(d) = 4(1.3)^d$ cm² after d days.

- Explain the meaning of 4 and 1.3. (1 point)
- Find the area after 3 days. (1 point)

Question 9 Line Against Curve (2 points)

Let $f(x) = 100x$ and $g(x) = 2^x$. Mia says that the line is always above the curve because 100 is such a big slope. Show that she is wrong by finding a whole number x where $g(x) > f(x)$.