

Algebra 2 - Exponential Growth and Decay - Worksheet

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

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice exponential growth and decay (Common Core F-LE.A.2, F-LE.B.5, A-SSE.B.3c and F-IF.C.8b). The first problems check growth factors and evaluating exponential functions, the middle problems add percent models, compound interest, and rewriting exponents, and the last six are word problems and multi-step tasks that need comparing linear and exponential plans and interpreting parameters.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **F-LE.A.2, F-LE.B.5, A-SSE.B.3c, F-IF.C.8b**

Exercise 1 - Growth or decay

Decide whether each function shows growth or decay and name the growth factor: $3(1.4)^x$, $5(0.8)^x$, $2\left(\frac{1}{3}\right)^x$.

Exercise 2 - Evaluate

Evaluate $f(x) = 3 \cdot 2^x$ at $x = 0, 1, 2, 3, 4$.

Exercise 3 - Write a function from a table

x	0	1	2	3
f(x)	5	10	20	40

Each output is twice the previous.

Write an exponential function for the table.

Exercise 4 - Two points

An exponential function $f(x) = a \cdot b^x$ passes through (1,6) and (3,54). Find a and b .

Exercise 5 - Population growth

A town of 12,000 people grows 3.5% per year. Write a function and find the population after 5 years.

Exercise 6 - Depreciation

Diego's car is worth \$24,000 and loses 15% of its value each year. Write a function for its value and find the value after 4 years.

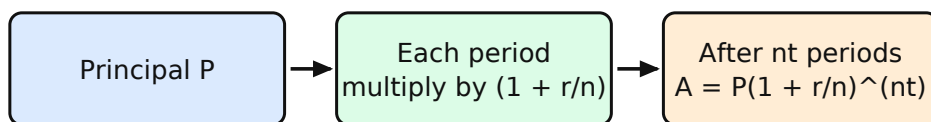
Exercise 7 - Half-life

A sample has 80 mg of a medicine that has a half-life of 3 days. Write $A(t)$ and find the amount after 9 days.

Exercise 8 - Doubling time

A culture of 50 bacteria doubles every 20 minutes. Write $B(t)$ for t in minutes and find the count after 60 minutes.

Exercise 9 - Compound interest



Compound interest repeats a multiplication.

Maya deposits \$2,000 at 4% interest compounded quarterly. Find the balance after 5 years.

Exercise 10 - Compounding frequency

Compare \$5,000 at 3% for 10 years compounded annually and compounded monthly.

Exercise 11 - Continuous compounding

Find the value of \$1,500 invested at 3% compounded continuously for 8 years using $A = Pe^{rt}$.

Exercise 12 - Rewrite exponents

Rewrite 2^{3x} with base 8 and $\left(\frac{1}{2}\right)^x$ with base 2.

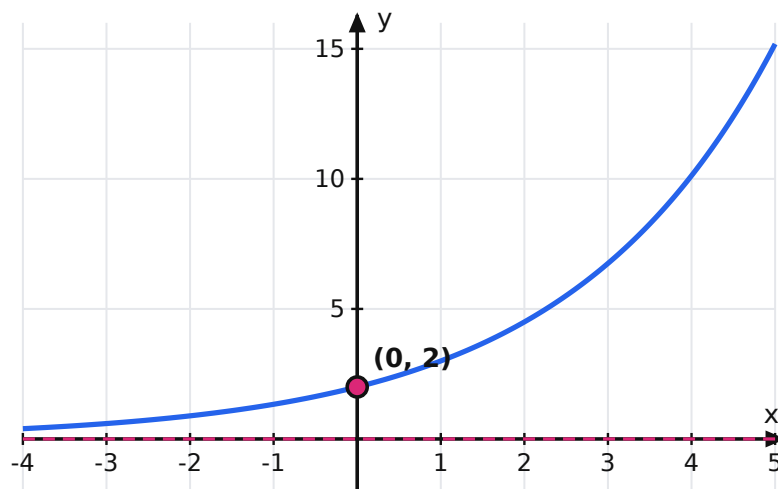
Exercise 13 - Effective annual rate

A credit card charges 2% interest per month, so a balance grows as 1.02^{12t} over t years. Rewrite this as b^t and find the annual growth rate.

Exercise 14 - Monthly equivalent

An account earns 7% per year. Write the growth as $(1.07)^t = (b)^{12t}$ and find the equivalent monthly rate.

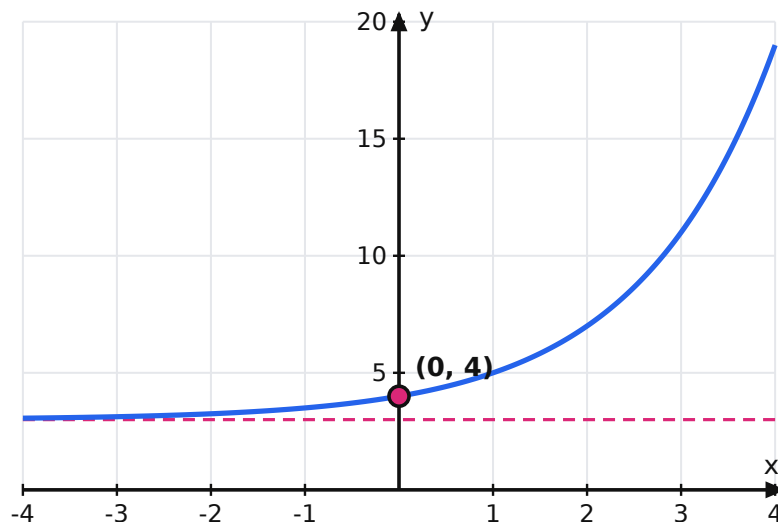
Exercise 15 - Graph features



$$f(x) = 2(1.5)^x.$$

Describe the graph of $f(x) = 2(1.5)^x$: y-intercept, asymptote, and end behavior.

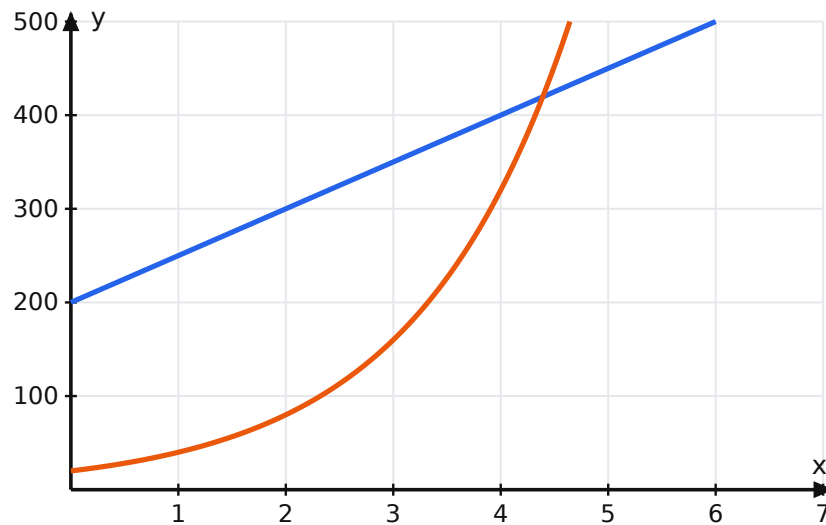
Exercise 16 - Shifted exponential



$$g(x) = 2^x + 3.$$

Give the y-intercept and horizontal asymptote of $g(x) = 2^x + 3$.

Exercise 17 - Linear or exponential



Option A (blue) and option B (orange).

Sofia compares two savings plans. Plan A starts with \$200 and adds \$50 each week. Plan B starts with \$20 and doubles each week. Find the first week in which Plan B has more.

Exercise 18 - Interpret parameters

A drug's concentration is $f(t) = 250(0.92)^t$ mg/L after t hours. Interpret the numbers 250 and 0.92, and find the concentration after 10 hours.

Exercise 19 - When does it exceed?

t (years)	7	8	9
$1000(1.05)^t$	?	?	?

Fill in the table.

An account holds $1000(1.05)^t$ dollars after t years. In which whole year does the balance first exceed \$1,500?

Exercise 20 - Find the error

Priya says a population that grows 5% per year has $b = 0.05$. Explain the error and write the correct growth factor.

Exercise 21 - Tripling

A video's views triple every month, starting from 4 views. Write a function and find the views after 5 months.