

Algebra 1 - Exponential Functions and Growth - Worksheet

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/

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

These 20 problems practice exponential functions and growth (Common Core F-LE.A.1, F-LE.A.2, F-LE.A.3, and F-IF.C.8b). You will identify growth and decay factors, graph exponential functions, compare linear and exponential growth, and model compound interest and half-life. The first problems are short skill checks, and the last six are word problems that need several steps. Work in order and show every line of your work, because a bare answer earns little credit on a test.

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**

Exercise 1 - Identify a and b

Identify the starting value and the growth factor of $y = 3 \cdot 2^x$. Is it growth or decay?

Exercise 2 - Decay factor

Identify the decay factor of $y = 5(0.8)^x$ and the percent decrease per step.

Exercise 3 - Complete a table

x	0	1	2	3
$y = 4 \cdot 3^x$	?	?	?	?

Complete the table.

Evaluate $y = 4 \cdot 3^x$ for $x = 0, 1, 2, 3$.

Exercise 4 - Exponential table

x	0	1	2	3
y	2	6	18	54

A table of values.

Show that the table is exponential and find the common ratio.

Exercise 5 - Linear table

x	0	1	2	3
y	5	9	13	17

A table of values.

Is the function linear or exponential? Explain.

Exercise 6 - Write from a table

A table shows $x=0,1,2$ with $y=5,10,20$. Write the exponential function.

Exercise 7 - Graph a growth function

Graph $y=2^x$ using the points with $x=-2,-1,0,1,2,3$.

Exercise 8 - Graph a decay function

Graph $y=\left(\frac{1}{2}\right)^x$ for $x=-2$ to $x=3$.

Exercise 9 - Rate to factor

Write the growth or decay factor for (a) 12% growth, (b) 8% decay.

Exercise 10 - Evaluate with a calculator

Evaluate $y=100(1.05)^x$ at $x=10$. Round to the nearest hundredth.

Exercise 11 - Intercept and asymptote

For $y=2^x$, give the y-intercept, the domain, the range, and describe the behavior as x becomes very negative.

Exercise 12 - Solve an exponential equation

Solve $2^x=32$ and $3^x=81$.

Exercise 13 - Linear versus exponential

Compare $f(x)=10x+5$ and $g(x)=2^x$ at $x=10$.

Exercise 14 - Domain and range

State the domain and range of $y = 3 \cdot 2^x$.

Exercise 15 - Rewrite the base

Rewrite $y = 2^{3t}$ in the form $y = b^t$ and give the growth factor per unit of t .

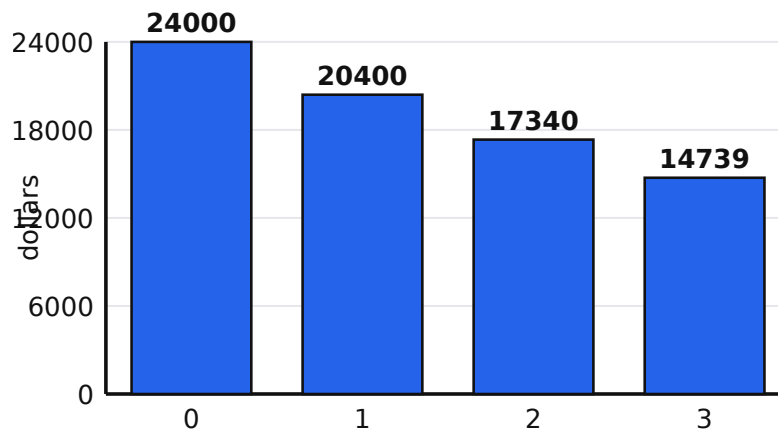
Exercise 16 - Town population

Year	0	1	2	5
Population	20,000	20,800	21,632	24,333

Population growth of 4% per year.

A town of 20,000 people grows 4% per year. Write a model and find the population after 5 years, to the nearest person.

Exercise 17 - Car value



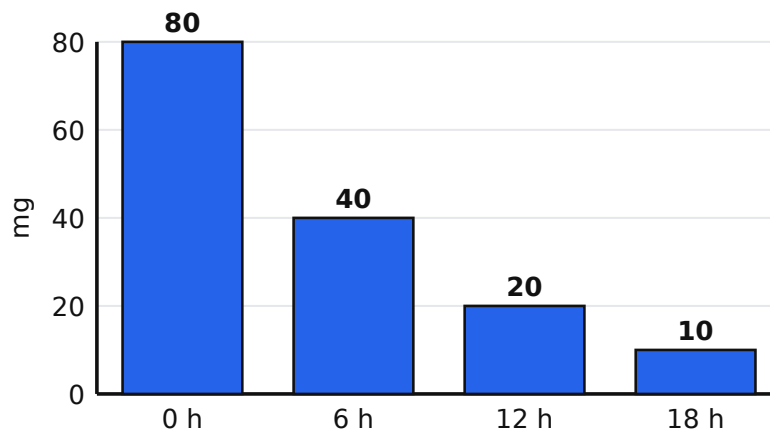
Car value by year.

A \$24,000 car loses 15% of its value each year. Write a model and find its value after 3 years.

Exercise 18 - Compound interest

Sofia deposits \$1,500 at 6% interest compounded annually. Find the amount after 8 years.

Exercise 19 - Medicine half-life



Amount of medicine left.

A 80 mg dose of medicine has a half-life of 6 hours, so $A = 80\left(\frac{1}{2}\right)^{t/6}$. Find the amount left after 18 hours.

Exercise 20 - Viral video

Day d	0	1	2	3	4
Video A	50	150	450	1350	4050
Video B	50	250	450	650	850

Views for two videos.

Video A has 50 views and triples every day: $A = 50 \cdot 3^d$. Video B has 50 views and gains 200 per day: $B = 50 + 200d$. Compare them on days 2 and 3.

Exercise 21 - Doubling time

Liam invests \$2,000 that doubles every 12 years, so $A = 2000 \cdot 2^{t/12}$. After how many years is the value \$8,000?