

Algebra 2 - Exponential Growth and Decay - Quiz

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: ____/____/____

Answer ten multiple-choice questions on exponential growth and decay. Choose one option for each question, then read the explanation to see why the correct choice works and which mistake, such as using the rate instead of the growth factor, each wrong choice shows.

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

Questions

Question 1

What is the growth factor in $f(x) = 7(1.08)^x$?

- A. 1.08
- B. 7
- C. 0.08
- D. 8

Question 2

A price rises 4% per year. Which factor describes this?

- A. 0.04
- B. 1.04
- C. 0.96
- D. 4

Question 3

A value falls 12% per year. Which model fits with starting value 900?

- A. $900(0.88)^t$
- B. $900(0.12)^t$
- C. $900(1.12)^t$
- D. $900 - 0.12t$

Question 4

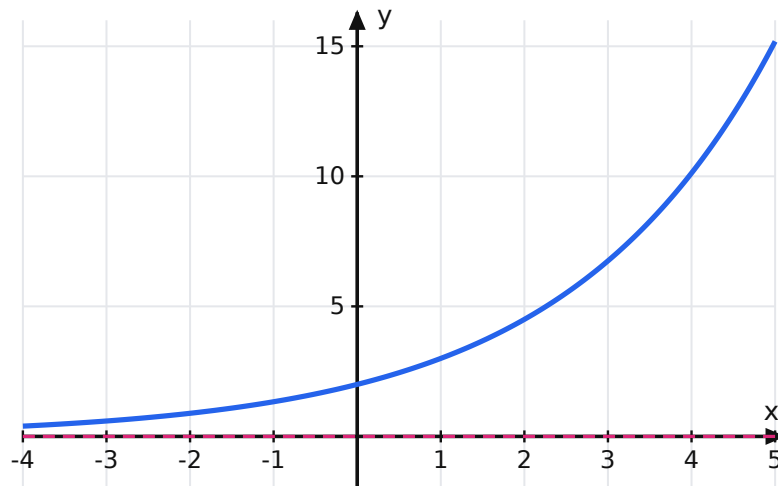
x	0	1	2	3
f(x)	2	6	18	54

Values of f.

Which function matches the table?

- A. $f(x) = 2 + 4x$
- B. $f(x) = 3 \cdot 2^x$
- C. $f(x) = 2 \cdot 3^x$
- D. $f(x) = 2x^3$

Question 5



Graph of an exponential function.

What is the horizontal asymptote of the graph?

- A. $x = 0$
- B. $y = 2$
- C. $y = 0$
- D. *There is none*

Question 6

Which is the compound interest formula for monthly compounding?

- A. $A = P(1+r)^{12t}$
- B. $A = P\left(1+\frac{r}{t}\right)^{12}$
- C. $A = P + 12rt$
- D. $A = P\left(1+\frac{r}{12}\right)^{12t}$

Question 7

After 3 half-lives, what fraction of a sample remains?

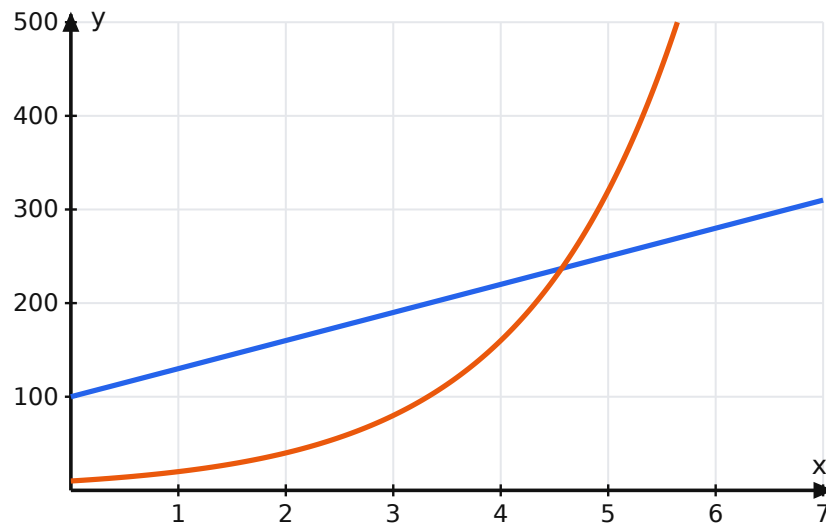
- A. $\frac{1}{16}$
- B. $\frac{1}{8}$
- C. $\frac{1}{4}$
- D. $\frac{1}{2}$

Question 8

Rewrite 4^x with base 2.

- A. 2^{2x}
- B. 2^x
- C. 2^{x+2}
- D. 8^x

Question 9



A linear plan and an exponential plan.

What happens to the exponential function compared with the linear function for large x?

- A. The linear function always stays larger
- B. They are always equal
- C. The exponential function stops growing
- D. The exponential function eventually exceeds the linear function

Question 10

Which is a correct statement about $f(t) = 80(0.75)^t$?

- A. The quantity loses 75% each period
- B. The quantity loses 25% each period

- C. The quantity gains 25% each period
- D. The quantity loses 0.75 each period

Answers

1. **A** - In $a \cdot b^x$, $b = 1.08$ is the factor. The rate is 8%, and 7 is the initial value.
2. **B** - Growth of 4% means $100\% + 4\% = 104\% = 1.04$.
3. **A** - A 12% decrease leaves 88% each year, so $b = 0.88$.
4. **C** - The ratio is 3 and the initial value is 2.
5. **C** - The curve approaches the x-axis on the left but never touches it.
6. **D** - There are 12 periods per year, each with rate $r/12$.
7. **B** - Each half-life halves the amount: $1/2 \cdot 1/2 \cdot 1/2 = 1/8$.
8. **A** - $4 = 2^2$, so $4^x = (2^2)^x = 2^{(2x)}$.
9. **D** - Multiplying by a constant factor each step eventually outgrows adding a constant amount.
10. **B** - $b = 0.75 = 1 - 0.25$, so the decrease is 25% per period.

Remember

- $f(x) = a \cdot b^x$: a is the initial value, b the growth factor.
- Growth factor $b = 1 + r$ (growth) or $1 - r$ (decay).
- Equal steps in x multiply the output by b .
- Compound interest: $A = P(1 + r/n)^{(nt)}$; continuous: $A = Pe^{(rt)}$.
- Rewrite b^x expressions to find equivalent rates.