

26. A researcher observed the growth of a certain colony of bacteria and recorded the data shown below.

Day	1	2	3	4	5
Number of cells in the colony	100	295	898	2,705	8,194

For the days observed, which of the following expressions best approximates the number of cells in the colony on the n th day?

- J
- F. $100n$ — DOESN'T work for Day 2
 - G. $300n$ — DOESN'T work for Day 1
 - H. $300 \cdot 3^n$ — DOESN'T work for Day 1
 - J. $100 \cdot 3^{n-1}$ — works
 - K. $300 \cdot 3^{n-1}$ — DOESN'T work for Day 1

Exponential growth
and finding formula
for series.

n = Number of days

19. A group of cells grows in number as described by the equation $y = 16(2)^t$, where t represents the number of days and y represents the number of cells. According to this formula, how many cells will be in the group at the end of the first 5 days?

- A.** 80
- B.** 160
- C.** 400
- D.** 512
- E.** 1,280

44. Consider the exponential equation $y = Ca^t$, where C and a are positive real constants and t is a positive real number. The value of y decreases as the value of t increases if and only if which of the following statements about a is true?

- F. $-1 < a$
- G. $0 < a$
- H. $0 < a < 1$
- J. $1 < a < 2$
- K. $1 < a$

EXPONENTS

$$\begin{aligned} C &> 0 \\ a &> 0 \\ t &> 0 \end{aligned}$$

The only way y could decrease as t increases is if a is a FRACTION

18. Write an exponential function to model the situation.

A population of 240 animals that increases at an annual rate of 16%.

[A] $f(x) = 240(1.16)^x$

[B] $f(x) = 240(0.84)^x$

[C] $f(x) = 240(0.116)^x$

[D] $f(x) = 240(0.084)^x$

19. Without graphing, determine whether the equation represents exponential growth or exponential decay.

$$f(x) = 8(0.29)^x$$

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20. Write an exponential function to model the situation. Then predict the value of the function after 5 years (to the nearest whole number). A population of 430 animals that decreases at an annual rate of 12%.

[A] $f(x) = 430(1.12)^x$; 2408

[B] $f(x) = 430(0.88)^x$; 1892

[C] $f(x) = 430(0.88)^x$; 227

[D] $f(x) = 430(1.12)^x$; 758

21. Use the fact that the half-life of a certain radioactive material is 7 days. An initial amount of the material has a mass of 512 kg. Write an exponential equation that models the decay of this material.

[A] $y = 512\left(\frac{1}{2}\right)^7$ [B] $y = 512\left(\frac{1}{2}\right)^{\frac{x}{7}}$ [C] $y = 512\left(\frac{1}{7}\right)^{\frac{x}{2}}$ [D] $y = 7\left(\frac{1}{2}\right)^x$

22. Use the graph of $y = e^x$ to evaluate the expression.

e^{-4}

[A] 1.2523 [B] 54.5982 [C] -10.8731 [D] 0.0183

23. Find the amount in a continuously compounded account for the given conditions.

principal: \$4000

annual interest rate: 8.2%

time: 30 yr

[A] \$42,547.87 [B] \$29,556.22 [C] \$50,820.22 [D] \$46,819.25

24. How much money invested at 6% compounded continuously for 3 years will yield \$840?

[A] \$1005.66 [B] \$701.63 [C] \$838.80 [D] \$586.05