ANUP ARYAL | DIGITAL SAT MATH
INDEPENDENT SAT MATH PRACTICE

Exponential Models

Foundation to Challenge

Practice should make the test feel easier, not merely familiar.
Work without the answer key first. Check answers through the SAT Practice Library after completing the set.

FOUNDATION

1 $M = 500(1.08)^{\frac{t}{2}}$ models mass after t years. Which description is correct?

A. increases 8 % every 2 years
B. increases 8 % every year
C. increases 8 units every 2 years
D. doubles every 2 years

STANDARD

2 $M = 720(0.7)^{4t}$ models mass after t years. Which description is correct?

A. decreases 30 % every 3 months
B. decreases 70 % every 4 years
C. decreases 30 % every 4 years
D. decreases 70 units every 3 months

FOUNDATION

3 *A* club has 75 members and doubles every 10 months. Which equation models v after t months?

A. $v = 75(2)^{\frac{t}{10}}$

B. $v = 75(2)^{10t}$

C. $v = 75 + \frac{2t}{10}$

D. $v = \frac{150t}{10}$

STANDARD

4 *A* club has 75 members and doubles every 8 months. Which equation models v after t years?

A. $v = 75(2)^{\frac{t}{8}}$

B. $v = 75(2)^{\frac{3t}{2}}$

C. $v = 75(2)^{\frac{2t}{3}}$

D. $v = 75(2)^{8t}$

5 *A* device costs $24,000 and loses 12% of value each year. Approximately what is it worth after 6 years?

A. $8,100

B. $11,150

C. $16,000

D. $21,120

FOUNDATION

6 Workers stock 360 shelves at *a* constant rate over 12 days. If $p(t)$ is shelves left after t days, what type of function is p?

A. increasing exponential

B. decreasing exponential

C. increasing linear

D. decreasing linear

7 A bacteria population is 40 initially and 50 after one hour. Which exponential model fits?

A. $P = 10t + 40$
B. $P = 40(1.25)^t$
C. $P = 40(10)^t$
D. $P = 10t^2 + 40$

STANDARD

8 A forest population decreases by 7% every 5 years. It starts at 18,000. Which model gives P after t years?

A. $18000(0.07)^{\frac{t}{5}}$
B. $18000 + 0.93(5t)$
C. $18000(0.93)^{5t}$
D. $18000(0.93)^{\frac{t}{5}}$

FOUNDATION

9 Which situation represents linear growth?

A. area increases 2% each year
B. sales increase 5% each year
C. floor area increases by 250 square feet each year
D. population triples every decade

STANDARD

10 A price follows $P = m(2)^{\frac{t}{n}}$. If $P(0) = 64$ and $P(20) = 128$, what are m and n?

A. $m = 64, n = 20$
B. $m = 32, n = 20$
C. $m = 64, n = 10$
D. $m = 128, n = 20$

ADVANCED

11 Stored data grows 3% every 12 hours. If 20 GB is stored now, which model gives $g(t)$ after t days?

A. $20(1.03)^{\frac{t}{12}}$

B. $20(1.03)^{12t}$

C. $20(1.03)^{\frac{t}{2}}$

D. $20(1.03)^{2t}$

FOUNDATION

12 The function $f(t)=9000(2)^{\frac{t}{360}}$ models a population. How many minutes does it take to double? Here t is measured in minutes.

STANDARD

13 $P(t)=96,000\left(\frac{1}{2}\right)^{\frac{t}{120}}$ gives the number of radioactive particles, where t is time in minutes. How many minutes until one-eighth remains?

FOUNDATION

14 A function q decreases 35% whenever x increases by 1 and $q(0)=20$. Which equation defines q?

A. $q=0.65(20)^x$

B. $q=1.35(20)^x$

C. $q=20(0.65)^x$

D. $q=20(1.35)^x$

15 If $f(x) = x - 25\%$ of x, what type of function is f?

A. increasing exponential
B. decreasing exponential
C. increasing linear
D. decreasing linear

16 A culture triples every 4 hours. If it starts with 200 cells, how many cells are there after 12 hours?

ADVANCED

17 A \$28,000 car loses 10% of its value each year. About how many years until it is worth \$14,000?

18 A population of 12,000 decreases 4% per year. About how many years until it reaches 7,500?

19 A substance decreases from $80\,g$ to $40\,g$ in 4 years. What is the annual percentage decay rate, to the nearest tenth of a percent?

STANDARD

20 An artwork is modeled by $f(x)=120(1.04)^x$. What does f(5)≈146 mean?

A. value is 5% greater than previous year
B. value is 5 times previous year
C. value increased by \$146 total
D. after 5 years, predicted value is about \$146

FOUNDATION

21 For $f(x)=3^x$, what is the sum of the coordinates of the y-intercept?

FINISHED?

Check your answers online

aryalanupme.github.io/sat-exponential-models.html

Do not stop at “wrong.” Identify why it was wrong: concept, algebra, arithmetic, interpretation, calculator choice, or timing.

I do not correct the answer first. I correct the reason.