Question ID f89af023

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: f89af023

2.1

A rectangular volleyball court has an area of 162 square meters. If the length of the court is twice the width, what is the width of the court, in meters?

A. 9

B. 18

C. 27

D. 54

Question ID e53add44

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: e53add44

2.2

$S(n) = 38{,}000a^n$

The function S above models the annual salary, in dollars, of an employee n years after starting a job, where a is a constant. If the employee's salary increases by 4% each year, what is the value of a ?

A. 0.04

B. 0.4

C. 1.04

D. 1.4

Question ID 926c246b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 926c246b

2.3

$D = 5{,}640(1.9)^t$

The equation above estimates the global data traffic D, in terabytes, for the year that is t years after 2010. What is the best interpretation of the number 5,640 in this context?

A. The estimated amount of increase of data traffic, in terabytes, each year

B. The estimated percent increase in the data traffic, in terabytes, each year

C. The estimated data traffic, in terabytes, for the year that is t years after 2010

D. The estimated data traffic, in terabytes, in 2010

Question ID 50e40f08

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 50e40f08

2.4

$$f(x) = (x + 6)(x - 4)$$

If the given function f is graphed in the *xy*-plane, where $y = f(x)$, what is the *x*-coordinate of an *x*-intercept of the graph?

Question ID be0c419e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: be0c419e

2.5

Immanuel purchased a certain rare coin on January 1. The function $f(x) = 65(1.03)^x$, where $0 \leq x \leq 10$, gives the predicted value, in dollars, of the rare coin x years after Immanuel purchased it. What is the best interpretation of the statement "$f(8)$ is approximately equal to 82" in this context?

A. When the rare coin's predicted value is approximately 82 dollars, it is 8% greater than the predicted value, in dollars, on January 1 of the previous year.

B. When the rare coin's predicted value is approximately 82 dollars, it is 8 times the predicted value, in dollars, on January 1 of the previous year.

C. From the day Immanuel purchased the rare coin to 8 years after Immanuel purchased the coin, its predicted value increased by a total of approximately 82 dollars.

D. 8 years after Immanuel purchased the rare coin, its predicted value is approximately 82 dollars.

Question ID a31417d1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: a31417d1

2.6

From 2005 through 2014, the number of music CDs sold in the United States declined each year by approximately 15% of the number sold the preceding year. In 2005, approximately 600 million CDs were sold in the United States. Of the following, which best models C, the number of millions of CDs sold in the United States, t years after 2005?

A. $C = 600(0.15)^t$

B. $C = 600(0.85)^t$

C. $C = 600(1.15)^t$

D. $C = 600(1.85)^t$

Question ID c4cd5bcc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: c4cd5bcc

2.7

In the *xy*-plane, the *y*-coordinate of the *y*-intercept of the graph of the function *f* is *c*. Which of the following must be equal to *c* ?

A. $f(0)$

B. $f(1)$

C. $f(2)$

D. $f(3)$

Question ID 78d5f91a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 78d5f91a

2.8

$f(x) = x^3 + 3x^2 - 6x - 1$

For the function f defined above, what is the value of $f(-1)$?

A. -11

B. -7

C. 7

D. 11

Question ID d675744f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

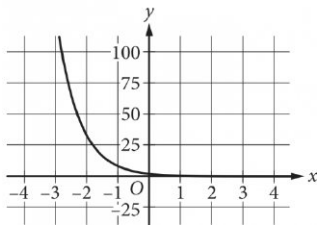
ID: d675744f

2.9

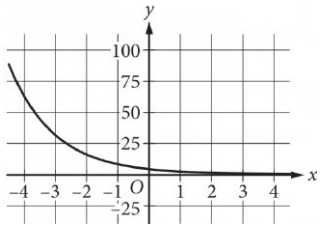
$y = 4(2^x)$

Which of the following is the graph in the *xy*-plane of the given equation?

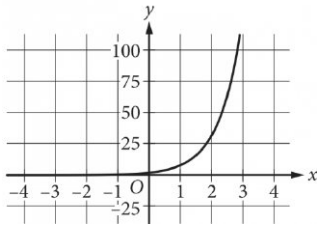
A.



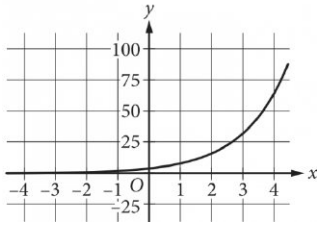
B.



C.



D.



Question ID f44a29a8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: f44a29a8

2.10

An object’s kinetic energy, in joules, is equal to the product of one-half the object’s mass, in kilograms, and the square of the object’s speed, in meters per second. What is the speed, in meters per second, of an object with a mass of 4 kilograms and kinetic energy of 18 joules?

A. 3

B. 6

C. 9

D. 36

Question ID d71f6dbf

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: d71f6dbf

2.11

The height, in feet, of an object x seconds after it is thrown straight up in the air can be modeled by the function $h(x) = -16x^2 + 20x + 5$. Based on the model, which of the following statements best interprets the equation $h(1.4) = 1.64$?

A. The height of the object 1.4 seconds after being thrown straight up in the air is 1.64 feet.

B. The height of the object 1.64 seconds after being thrown straight up in the air is 1.4 feet.

C. The height of the object 1.64 seconds after being thrown straight up in the air is approximately 1.4 times as great as its initial height.

D. The speed of the object 1.4 seconds after being thrown straight up in the air is approximately 1.64 feet per second.

Question ID 6676f055

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 6676f055

2.12

$$f(\theta) = -0.28(\theta - 27)^2 + 880$$

An engineer wanted to identify the best angle for a cooling fan in an engine in order to get the greatest airflow. The engineer discovered that the function above models the airflow $f(\theta)$, in cubic feet per minute, as a function of the angle of the fan θ, in degrees. According to the model, what angle, in degrees, gives the greatest airflow?

A. –0.28

B. 0.28

C. 27

D. 880

Question ID dd8ac009

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: dd8ac009

2.13

Time (years)	Total amount (dollars)
0	670.00
1	674.02
2	678.06

Sara opened a savings account at a bank. The table shows the exponential relationship between the time t, in years, since Sara opened the account and the total amount d, in dollars, in the account. If Sara made no additional deposits or withdrawals, which of the following equations best represents the relationship between t and d?

A. $d = 0.006(1 + 670)^t$

B. $d = 670(1 + 0.006)^t$

C. $d = 0.006(670t)$

D. $d = 670(0.006 + t)$

Question ID 281a4f3b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 281a4f3b

2.14

A certain college had 3,000 students enrolled in 2015. The college predicts that after 2015, the number of students enrolled each year will be 2% less than the number of students enrolled the year before. Which of the following functions models the relationship between the number of students enrolled, $f(x)$, and the number of years after 2015, x ?

A. $f(x) = 0.02(3{,}000)^x$

B. $f(x) = 0.98(3{,}000)^x$

C. $f(x) = 3{,}000(0.02)^x$

D. $f(x) = 3{,}000(0.98)^x$

Question ID 100030d9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 100030d9

2.15

A rubber ball bounces upward one-half the height that it falls each time it hits the ground. If the ball was originally dropped from a distance of 20.0 feet above the ground, what was its maximum height above the ground, in feet, between the third and fourth time it hit the ground?

Question ID c7a187a7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: c7a187a7

2.16

$$f(x) = x^2 - 18x - 360$$

If the given function f is graphed in the *xy*-plane, where $y = f(x)$, what is an *x*-intercept of the graph?

A. $(-12, 0)$

B. $(-30, 0)$

C. $(-360, 0)$

D. $(12, 0)$

Question ID e1391dd6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: e1391dd6

2.17

According to Moore’s law, the number of transistors included on microprocessors doubles every 2 years. In 1985, a microprocessor was introduced that had 275,000 transistors. Based on this information, in which of the following years does Moore’s law estimate the number of transistors to reach 1.1 million?

A. 1987

B. 1989

C. 1991

D. 1994

Question ID 5bf0f84a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 5bf0f84a

2.18

$$h(t) = -16t^2 + 110t + 72$$

The function above models the height h, in feet, of an object above ground t seconds after being launched straight up in the air. What does the number 72 represent in the function?

A. The initial height, in feet, of the object

B. The maximum height, in feet, of the object

C. The initial speed, in feet per second, of the object

D. The maximum speed, in feet per second, of the object

Question ID 70ebd3d0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 70ebd3d0

2.19

$N(d) = 115(0.90)^d$

The function N defined above can be used to model the number of species of brachiopods at various ocean depths d, where d is in hundreds of meters. Which of the following does the model predict?

A. For every increase in depth by 1 meter, the number of brachiopod species decreases by 115.

B. For every increase in depth by 1 meter, the number of brachiopod species decreases by 10%.

C. For every increase in depth by 100 meters, the number of brachiopod species decreases by 115.

D. For every increase in depth by 100 meters, the number of brachiopod species decreases by 10%.

Question ID 97158b3a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 97158b3a

2.20

The area *A*, in square centimeters, of a rectangular painting can be represented by the expression $w(w+29)$, where w is the width, in centimeters, of the painting. Which expression represents the length, in centimeters, of the painting?

A. w

B. 29

C. $(w+29)$

D. $w(w+29)$

Question ID dba7432e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: dba7432e

2.21

x	$f(x)$
0	5
1	$\frac{5}{2}$
2	$\frac{5}{4}$
3	$\frac{5}{8}$

The table above gives the values of the function f for some values of x.
Which of the following equations could define f ?

A. $f(x) = 5(2^{x+1})$

B. $f(x) = 5(2^{x})$

C. $f(x) = 5(2^{-(x+1)})$

D. $f(x) = 5(2^{-x})$

Question ID f5e8ccf1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: f5e8ccf1

2.22

$f(x) = (x+4)(x-1)(2x-3)$

The function f is defined above. Which of the following is NOT an x-intercept of the graph of the function in the xy-plane?

A. $(-4, 0)$

B. $\left(-\frac{2}{3}, 0\right)$

C. $(1, 0)$

D. $\left(\frac{3}{2}, 0\right)$

Question ID 5c00c2c1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 5c00c2c1

2.23

There were no jackrabbits in Australia before 1788 when 24 jackrabbits were introduced. By 1920 the population of jackrabbits had reached 10 billion. If the population had grown exponentially, this would correspond to a 16.2% increase, on average, in the population each year. Which of the following functions best models the population $p(t)$ of jackrabbits t years after 1788?

A. $p(t) = 1.162(24)^t$

B. $p(t) = 24(2)^{1.162t}$

C. $p(t) = 24(1.162)^t$

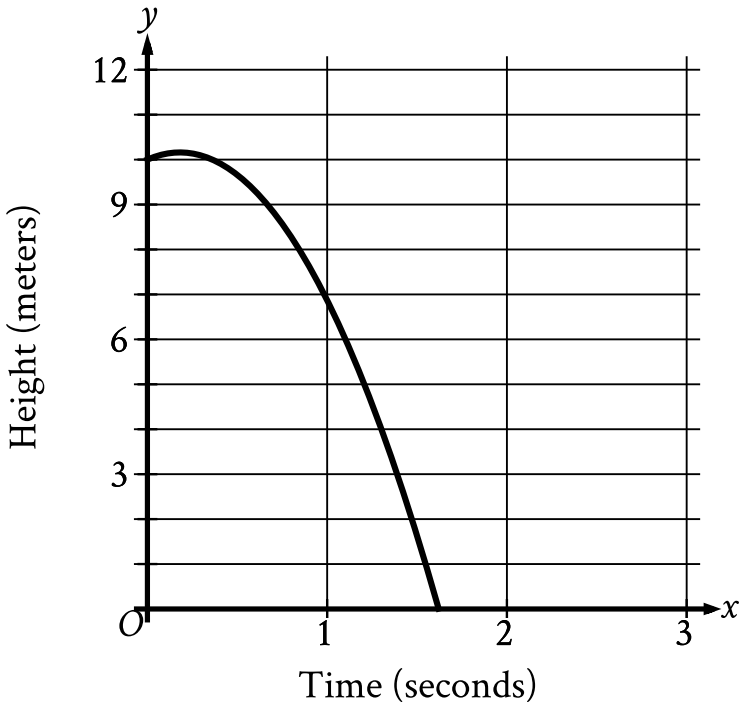
D. $p(t) = (24, \cdot, 1.162)^t$

Question ID 9ff88bb5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 9ff88bb5

2.24



A competitive diver dives from a platform into the water. The graph shown gives the height above the water y, in meters, of the diver x seconds after diving from the platform. What is the best interpretation of the *x*-intercept of the graph?

A. The diver reaches a maximum height above the water at 1.6 seconds.

B. The diver hits the water at 1.6 seconds.

C. The diver reaches a maximum height above the water at 0.2 seconds.

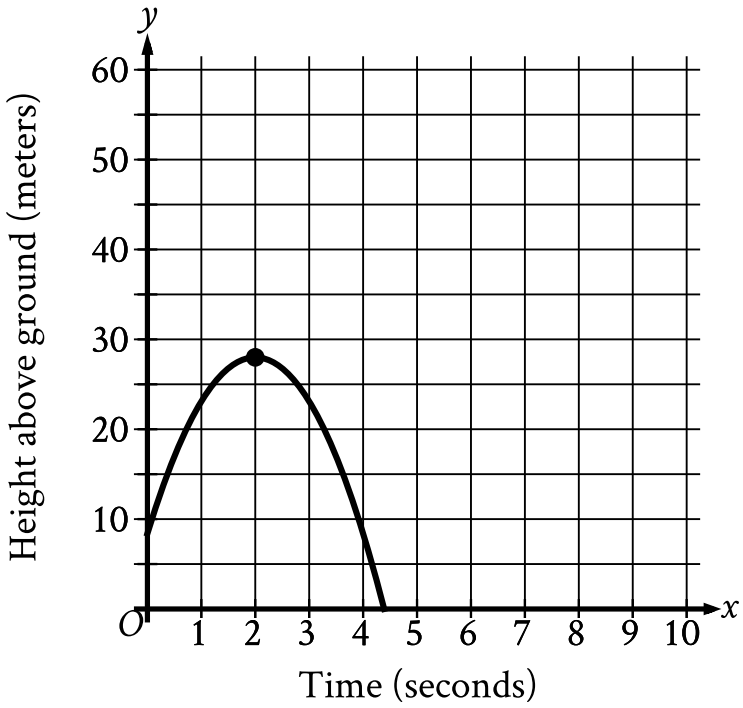
D. The diver hits the water at 0.2 seconds.

Question ID 197bed38

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 197bed38

2.25



An object was launched upward from a platform. The graph shown models the height above ground, y, in meters, of the object x seconds after it was launched. For which of the following intervals of time was the height of the object increasing for the entire interval?

A. From $x = 0$ to $x = 2$

B. From $x = 0$ to $x = 4$

C. From $x = 2$ to $x = 3$

D. From $x = 3$ to $x = 4$

Question ID 15c364bf

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	■■□

ID: 15c364bf

2.26

A sample of a certain isotope takes 29 years to decay to half its original mass. The function $s(t) = 184(0.5)^{\frac{t}{29}}$ gives the approximate mass of this isotope, in grams, that remains t years after a 184-gram sample starts to decay. Which statement is the best interpretation of $s(87) = 23$ in this context?

A. Approximately 23 grams of the sample remains 87 years after the sample starts to decay.

B. The mass of the sample has decreased by approximately 23 grams 87 years after the sample starts to decay.

C. The mass of the sample has decreased by approximately 87 grams 23 years after the sample starts to decay.

D. Approximately 87 grams of the sample remains 23 years after the sample starts to decay.