Question ID 9903ff5b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 9903ff5b

The area of a triangle is 270 square centimeters. The length of the base of the triangle is 12 centimeters greater than the height of the triangle. What is the height, in centimeters, of the triangle?

A. 15

B. 18

C. 30

D. 36

Question ID 9c086e5a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 9c086e5a

x	y
1	11
2	19
3	a

The table shows three values of x and their corresponding values of y for the equation $y = 4(2)^x + 3$. In the table, a is a constant. What is the value of a?

A. 67

B. 35

C. 32

D. 27

Question ID 4782fd69

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 4782fd69

The function $f(x) = 206(1.034)^x$ models the value, in dollars, of a certain bank account by the end of each year from 1957 through 1972, where x is the number of years after 1957. Which of the following is the best interpretation of "$f(5)$ is approximately equal to 243" in this context?

A. The value of the bank account is estimated to be approximately 5 dollars greater in 1962 than in 1957.

B. The value of the bank account is estimated to be approximately 243 dollars in 1962.

C. The value, in dollars, of the bank account is estimated to be approximately 5 times greater in 1962 than in 1957.

D. The value of the bank account is estimated to increase by approximately 243 dollars every 5 years between 1957 and 1972.

Question ID c9f2f07d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: c9f2f07d

$$f(x) = (x + 6)(x + 5)(x - 4)$$

The function f is given. Which table of values represents $y = f(x) - 3$?

A.

x	y
-6	-9
-5	-8
4	1

B.

x	y
-6	-3
-5	-3
4	-3

C.

x	y
-6	-3
-5	-2
4	7

D.

x	y
-6	3
-5	3
4	3

Question ID 67373f12

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 67373f12

On April 1, there were 233 views of an advertisement posted on a website. Every 2 days after April 1, the number of views of the advertisement had increased by 70% of the number of views 2 days earlier. The function f gives the predicted number of views x days after April 1. Which equation defines f?

A. $f(x) = 233(0.70)^{\frac{x}{2}}$

B. $f(x) = 233(0.70)^{2x}$

C. $f(x) = 233(1.70)^{\frac{x}{2}}$

D. $f(x) = 233(1.70)^{2x}$

Question ID 72bf9318

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 72bf9318

The function f is defined by $f(x) = 7x^3$. In the *xy*-plane, the graph of $y = g(x)$ is the result of shifting the graph of $y = f(x)$ down 2 units. Which equation defines function g?

A. $g(x) = \frac{7}{2}x^3$

B. $g(x) = 7x^{\frac{3}{2}}$

C. $g(x) = 7x^3 + 2$

D. $g(x) = 7x^3 - 2$

Question ID f0b332e0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: f0b332e0

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.

Question ID ed5b7c61

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: ed5b7c61

$$q(x) = 32(2^x)$$

Which table gives three values of x and their corresponding values of $q(x)$ for function q?

A.

x	-1	0	1
$q(x)$	-64	0	64

B.

x	-1	0	1
$q(x)$	$\frac{1}{16}$	2	64

C.

x	-1	0	1
$q(x)$	$\frac{1}{16}$	32	64

D.

x	-1	0	1
$q(x)$	16	32	64

Question ID 05f5125a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 05f5125a

$$f(x) = 4{,}000(0.75)^x$$

An entomologist recommended a program to reduce a certain invasive beetle population in an area. The given function estimates this beetle species' population x years after 2012, where $x \leq 7$. Which of the following is the best interpretation of $4{,}000$ in this context?

A. The estimated initial beetle population for this species and area in 2012

B. The estimated beetle population for this species and area 7 years after 2012

C. The estimated percent decrease in the beetle population for this species and area each year after 2012

D. The estimated percent decrease in the beetle population for this species and area every 7 years after 2012

Question ID d39e9424

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: d39e9424

The function f is defined by $f(x) = 5\left(\frac{1}{4} - x\right)^2 + \frac{11}{4}$. What is the value of $f\left(\frac{1}{4}\right)$?

Question ID 6075b3e6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 6075b3e6

A scientist initially measures $12{,}000$ bacteria in a growth medium. 4 hours later, the scientist measures $24{,}000$ bacteria. Assuming exponential growth, the formula $P = C(2)^{rt}$ gives the number of bacteria in the growth medium, where r and C are constants and P is the number of bacteria t hours after the initial measurement. What is the value of r?

A. $\frac{1}{12{,}000}$

B. $\frac{1}{4}$

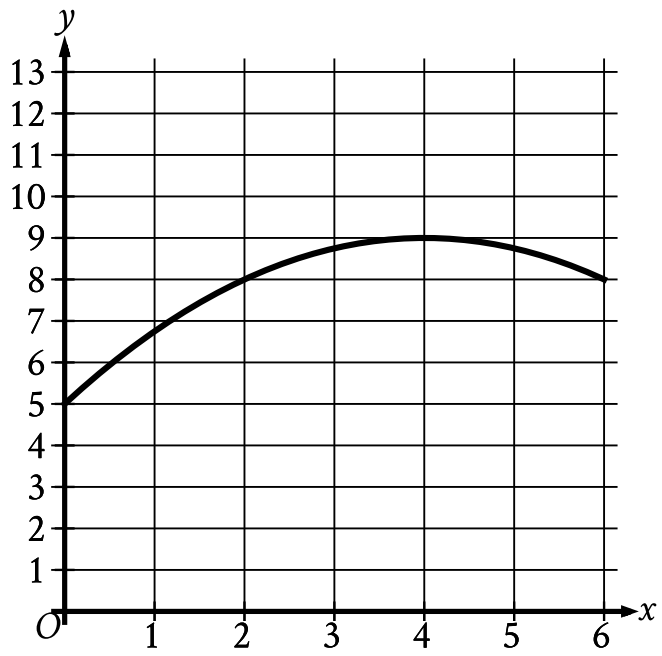
C. 4

D. $12{,}000$

Question ID f1e48337

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: f1e48337



The graph models the number of active projects a company was working on x months after the end of November 2012, where $0 \leq x \leq 6$. According to the model, what is the predicted number of active projects the company was working on at the end of November 2012?

A. 0

B. 5

C. 8

D. 9

Question ID 089f576c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 089f576c

$$f(x) = 3{,}000(0.75)^x$$

A conservation scientist implemented a program to reduce the population of a certain species in an area. The given function estimates this species' population x years after 2008, where $x \leq 8$. Which of the following is the best interpretation of $3{,}000$ in this context?

A. The estimated percent decrease in the population for this species and area every 8 years after 2008

B. The estimated percent decrease in the population for this species and area each year after 2008

C. The estimated population for this species and area 8 years after 2008

D. The estimated initial population for this species and area in 2008

Question ID 4fb712ae

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 4fb712ae

$$h(t) = -16t^2 + b$$

The function h estimates an object's height, in feet, above the ground t seconds after the object is dropped, where b is a constant. The function estimates that the object is $3{,}364$ feet above the ground when it is dropped at $t = 0$. Approximately how many seconds after being dropped does the function estimate the object will hit the ground?

A. 7.25

B. 14.50

C. 105.13

D. 210.25

Question ID 8df65561

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 8df65561

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

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. $(-30, 0)$

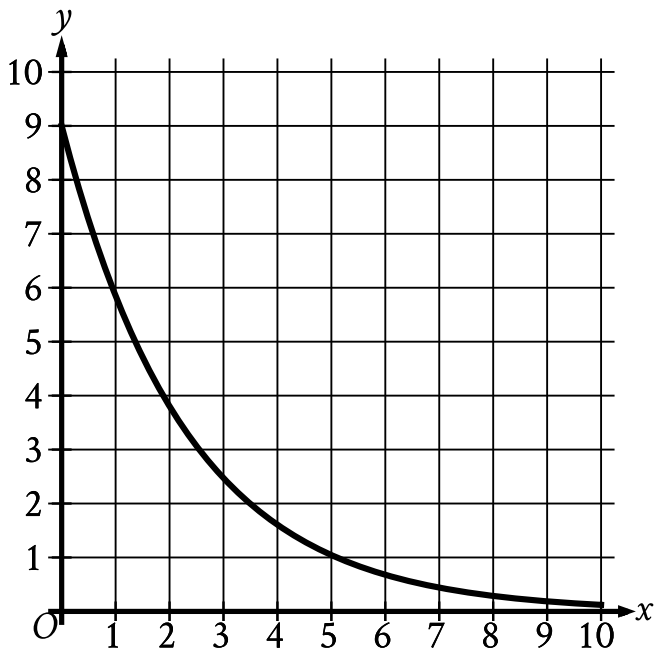
C. $(-360, 0)$

D. $(12, 0)$

Question ID 172e8982

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 172e8982



The graph gives the estimated number of catalogs y, in thousands, a company sent to its customers at the end of each year, where x represents the number of years since the end of 1992, where $0 \leq x \leq 10$. Which statement is the best interpretation of the *y*-intercept in this context?

A. The estimated total number of catalogs the company sent to its customers during the first 10 years was $9{,}000$.

B. The estimated total number of catalogs the company sent to its customers from the end of 1992 to the end of 2002 was 90.

C. The estimated number of catalogs the company sent to its customers at the end of 1992 was 9.

D. The estimated number of catalogs the company sent to its customers at the end of 1992 was $9{,}000$.

Question ID f929d680

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: f929d680

The number of bacteria in a liquid medium doubles every day. There are $44{,}000$ bacteria in the liquid medium at the start of an observation. Which represents the number of bacteria, y, in the liquid medium t days after the start of the observation?

A. $y = \frac{1}{2}$msup

B. $y = 2$msup

C. $y = 44{,}000$msup

D. $y = 44{,}000$msup

Question ID d1b142ac

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: d1b142ac

The area A, in square centimeters, of a rectangular cutting board can be represented by the expression $w(w+9)$, where w is the width, in centimeters, of the cutting board. Which expression represents the length, in centimeters, of the cutting board?

A. $w(w+9)$

B. w

C. 9

D. $(w+9)$

Question ID ddcbf768

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: ddcbf768

A model predicts that the population of Bergen was $15{,}000$ in 2005. The model also predicts that each year for the next 5 years, the population p increased by 4% of the previous year's population. Which equation best represents this model, where x is the number of years after 2005, for $x \leq 5$?

A. $p = 0.96$msup

B. $p = 1.04$msup

C. $p = 15{,}000$msup

D. $p = 15{,}000$msup

Question ID 9dcc9dd4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 9dcc9dd4

The function $f(t) = 40{,}000(2)^{\frac{t}{790}}$ gives the number of bacteria in a population t minutes after an initial observation. How much time, in minutes, does it take for the number of bacteria in the population to double?

A. 2

B. 790

C. $1{,}580$

D. $40{,}000$

Question ID 00efe3dc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 00efe3dc

A company has a newsletter. In January 2018, there were $1{,}300$ customers subscribed to the newsletter. For the next 24 months after January 2018, the total number of customers subscribed to the newsletter each month was 7% greater than the total number subscribed the previous month. Which equation gives the total number of customers, c, subscribed to the company's newsletter m months after January 2018, where $m \leq 24$?

A. $c = 1{,}300$msup

B. $c = 1{,}300$msup

C. $c = 1{,}300$msup

D. $c = 1{,}300$msup

Question ID eb1e2a4b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: eb1e2a4b

x	$h(x)$
0	1.23
2	1.54
4	1.94

The table shows the exponential relationship between the number of years, x, since Hana started training in pole vault, and the estimated height $h(x)$, in meters, of her best pole vault for that year. Which of the following functions best represents this relationship, where $x \leq 4$?

A. $h(x) = 1.12(0.23)^x$

B. $h(x) = 1.12(1.23)^x$

C. $h(x) = 1.23(0.12)^x$

D. $h(x) = 1.23(1.12)^x$

Question ID f5bdbb2d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: f5bdbb2d

A function p estimates that there were $2{,}000$ animals in a population in 1998. Each year from 1998 to 2010, the function estimates that the number of animals in this population increased by 3% of the number of animals in the population the previous year. Which equation defines this function, where $p(x)$ is the estimated number of animals in the population x years after 1998?

A. $p(x) = 2{,}000(3)^x$

B. $p(x) = 2{,}000(1.97)^x$

C. $p(x) = 2{,}000(1.03)^x$

D. $p(x) = 2{,}000(0.97)^x$

Question ID bef1b84d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

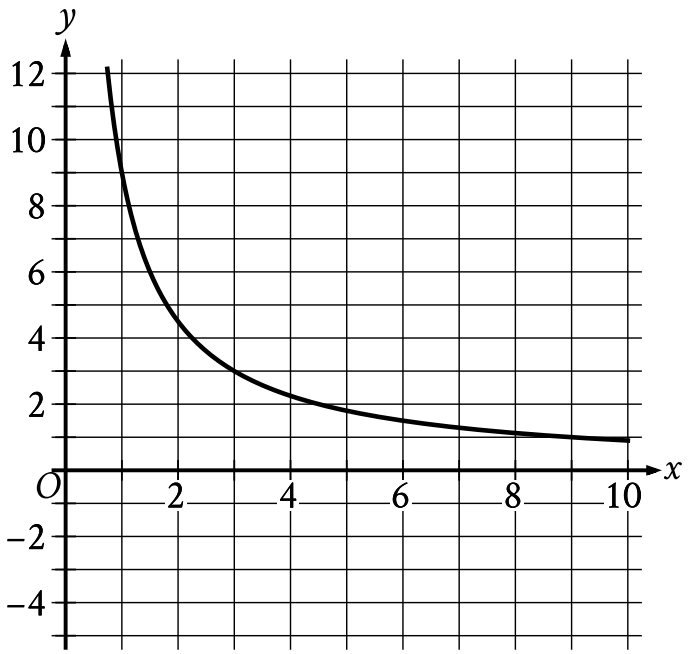
ID: bef1b84d

The exponential function g is defined by $g(x) = 19 \cdot a^x$, where a is a positive constant. If $g(3) = 2{,}375$, what is the value of $g(4)$?

Question ID 36f0ebb0

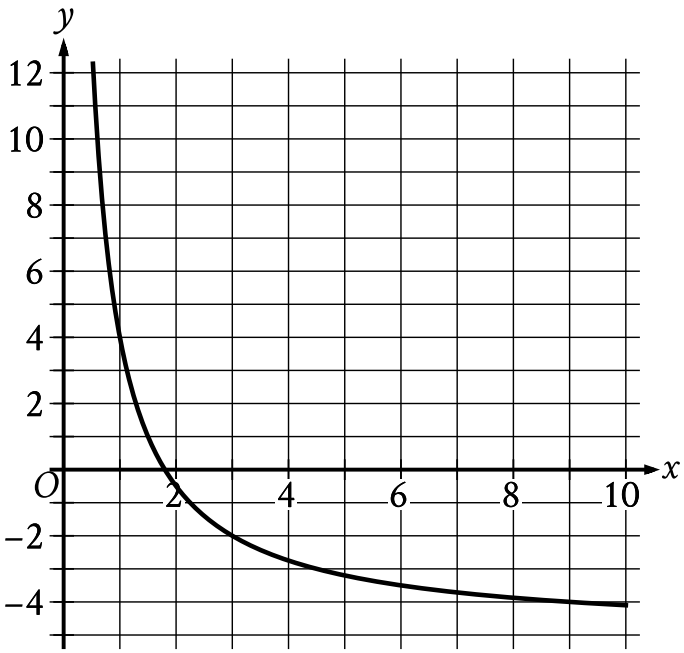
Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 36f0ebb0

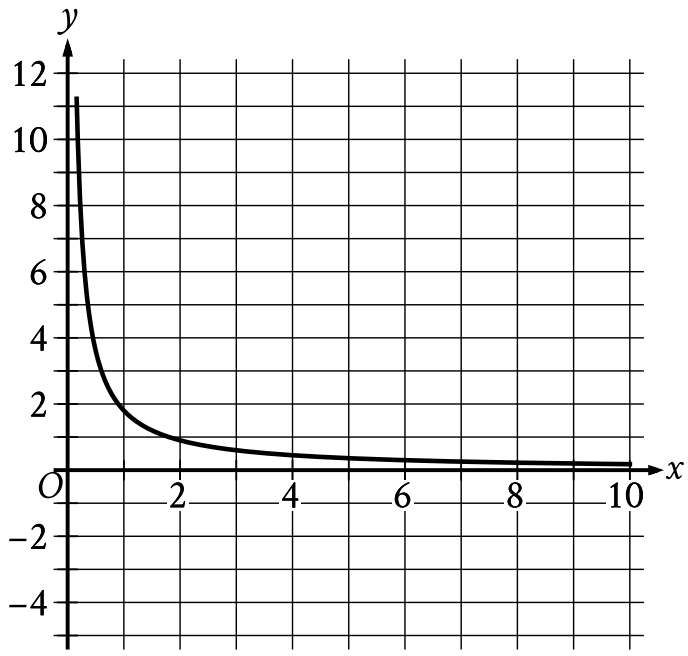


The graph of the rational function f is shown, where $y = f(x)$ and $x \geq 0$. Which of the following is the graph of $y = f(x) + 5$, where $x \geq 0$?

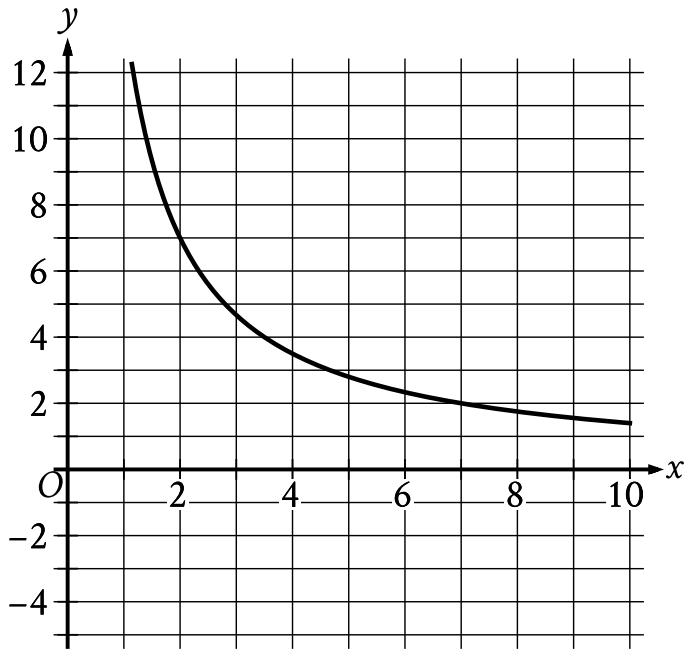
A.



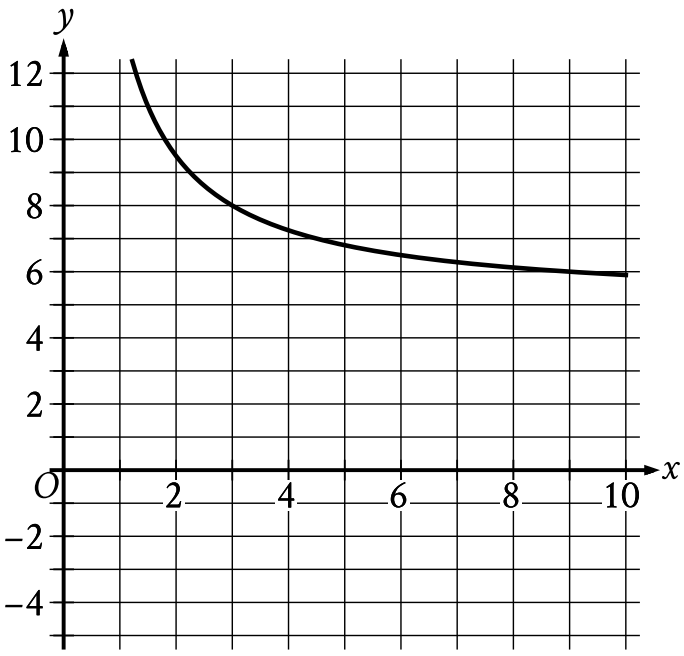
B.



C.



D.



Question ID dbb64b2b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: dbb64b2b

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 89da1199

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 89da1199

$$f(x) = \frac{a-19}{x} + 5$$

In the given function f, a is a constant. The graph of function f in the *xy*-plane, where $y = f(x)$, is translated 3 units down and 4 units to the right to produce the graph of $y = g(x)$. Which equation defines function g?

A. $g(x) = \frac{a-19}{x+4} + 2$

B. $g(x) = \frac{a-19}{x-4} + 2$

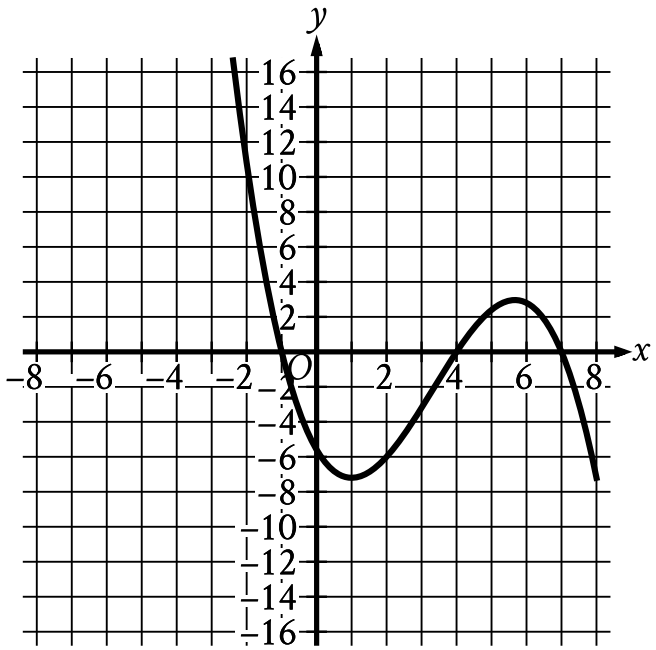
C. $g(x) = \frac{a-22}{x+4} + 5$

D. $g(x) = \frac{a-22}{x-4} + 5$

Question ID 20d5ffc9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 20d5ffc9



The graph of $y = f(x)$ is shown, where the function f is defined by $f(x) = ax^3 + bx^2 + cx + d$ and a, b, c, and d are constants. For how many values of x does $f(x) = 0$?

A. One

B. Two

C. Three

D. Four

Question ID 3b82eccc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 3b82eccc

The product of a positive number x and the number that is 8 more than x is 180. What is the value of x?

A. 5

B. 10

C. 18

D. 36

Question ID 9955f37a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 9955f37a

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

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 c38751a4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: c38751a4

$$m(t) = -0.0274\left(\frac{t}{7}\right)^2 + 7.3873\left(\frac{t}{7}\right) + 75.032$$

The function m gives the predicted body mass $m(t)$, in kilograms (kg), of a certain animal t days after it was born in a wildlife reserve, where $t \leq 390$. Which of the following is the best interpretation of the statement "$m(330)$ is approximately equal to 362" in this context?

A. The predicted body mass of the animal was approximately $330\ \text{kg}\ 362$ days after it was born.

B. The predicted body mass of the animal was approximately $362\ \text{kg}\ 330$ days after it was born.

C. The predicted body mass of the animal was approximately $362\ \text{kg}\ \frac{330}{7}$ days after it was born.

D. The predicted body mass of the animal was approximately $\frac{330}{7}\ \text{kg}\ 362$ days after it was born.

Question ID 55326c43

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 55326c43

The equation $E(t) = 5(1.8)^t$ gives the estimated number of employees at a restaurant, where t is the number of years since the restaurant opened. Which of the following is the best interpretation of the number 5 in this context?

A. The estimated number of employees when the restaurant opened

B. The increase in the estimated number of employees each year

C. The number of years the restaurant has been open

D. The percent increase in the estimated number of employees each year

Question ID 6095e4fc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 6095e4fc

A rectangle has a length of x units and a width of $(x - 15)$ units. If the rectangle has an area of 76 square units, what is the value of x?

A. 4

B. 19

C. 23

D. 76

Question ID c14d9ecc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: c14d9ecc

$$f(x) = x^5 + 9x + 17$$

For the given function f, the graph of $y = f(x)$ in the *xy*-plane passes through the point $(0, b)$, where b is a constant. What is the value of b?

Question ID a6b0b2d1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: a6b0b2d1

$$p(x) + 57 = x^2$$

The given equation relates the value of x and its corresponding value of $p(x)$ for the function p. What is the minimum value of the function p?

A. $-3{,}249$

B. -57

C. 57

D. $3{,}249$

Question ID a6dc0fde

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: a6dc0fde

x	$g(x)$
-1	25
0	1
1	$\frac{1}{25}$
2	$\frac{1}{625}$

For the exponential function g, the table shows four values of x and their corresponding values of $g(x)$. Which equation defines g?

A. $g(x) = -25^x$

B. $g(x) = -\left(\frac{1}{25}\right)^x$

C. $g(x) = 25^x$

D. $g(x) = \left(\frac{1}{25}\right)^x$

Question ID ffc85a92

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: ffc85a92

The function f is defined by $f(x) = 270(0.1)^x$. What is the value of $f(0)$?

A. 0

B. 1

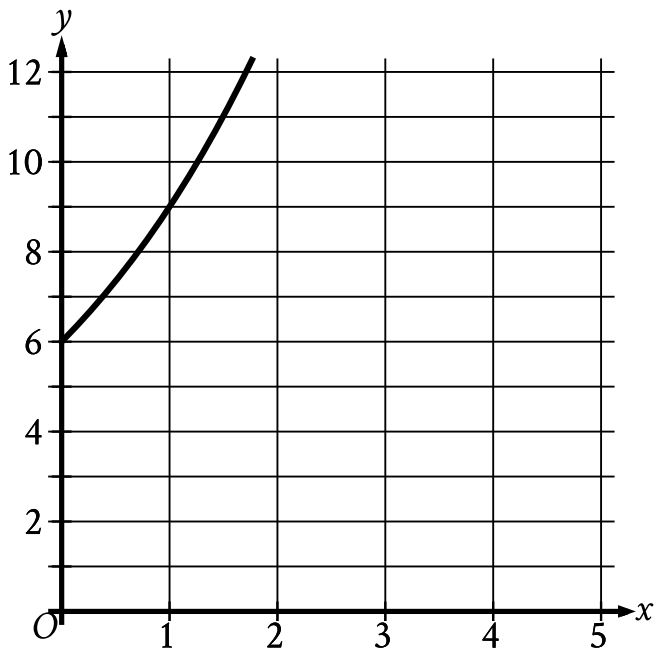
C. 27

D. 270

Question ID 92a352a9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 92a352a9



The graph gives the estimated population y, in thousands, of a town x years since 2003, where $0 \leq x \leq 5$. Which of the following best describes the increase in the estimated population from $x = 0$ to $x = 1$?

A. The estimated population at $x = 1$ is 0.5 times the estimated population at $x = 0$.

B. The estimated population at $x = 1$ is 1.5 times the estimated population at $x = 0$.

C. The estimated population at $x = 1$ is 2.5 times the estimated population at $x = 0$.

D. The estimated population at $x = 1$ is 3.5 times the estimated population at $x = 0$.

Question ID 8746c762

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 8746c762

Bacteria are growing in a liquid growth medium. There were $300{,}000$ cells per milliliter during an initial observation. The number of cells per milliliter doubles every 3 hours. How many cells per milliliter will there be 15 hours after the initial observation?

A. $1{,}500{,}000$

B. $2{,}400{,}000$

C. $4{,}500{,}000$

D. $9{,}600{,}000$

Question ID a2a2a711

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: a2a2a711

The function $f(w) = 6w^2$ gives the area of a rectangle, in square feet (ft^2), if its width is w ft and its length is 6 times its width. Which of the following is the best interpretation of $f(14) = 1{,}176$?

A. If the width of the rectangle is 14 ft, then the area of the rectangle is $1{,}176$ ft^2.

B. If the width of the rectangle is 14 ft, then the length of the rectangle is $1{,}176$ ft.

C. If the width of the rectangle is $1{,}176$ ft, then the length of the rectangle is 14 ft.

D. If the width of the rectangle is $1{,}176$ ft, then the area of the rectangle is 14 ft^2.

Question ID 7ed068cf

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 7ed068cf

An egg is thrown from a rooftop. The equation $h = -4.9t^2 + 9t + 18$ represents this situation, where h is the height of the egg above the ground, in meters, t seconds after it is thrown. According to the equation, what is the height, in meters, from which the egg was thrown?

Question ID 8a89ef72

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 8a89ef72

Time (years)	Total amount (dollars)
0	604.00
1	606.42
2	608.84

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

A. $n =$ msup

B. $n =$ msup

C. $n = 604$msup

D. $n = 0.004$msup

Question ID c54102e2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: c54102e2

$$g(x) = 11\left(\frac{1}{12}\right)^x$$

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

A. $(0, 11)$

B. $(0, 132)$

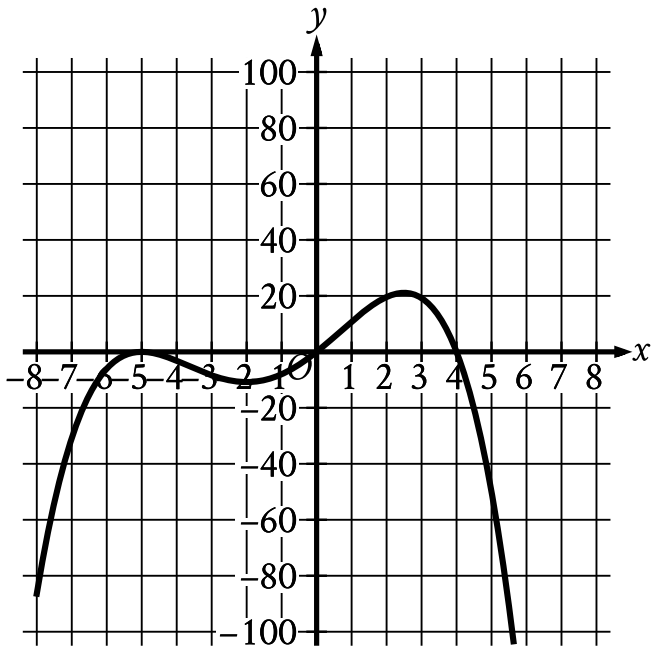
C. $(0, 1)$

D. $(0, 12)$

Question ID fe5eca98

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: fe5eca98



Which of the following could be the equation of the graph shown in the *xy*-plane?

A. $y = -\frac{1}{10}x(x-4)(x+5)$

B. $y = -\frac{1}{10}x(x-4)(x+5)^2$

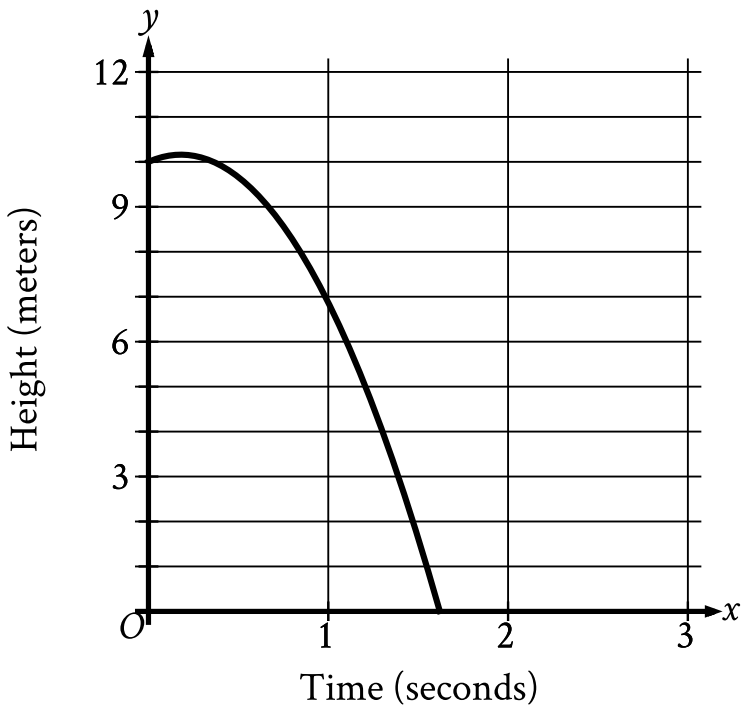
C. $y = -\frac{1}{10}x(x-5)(x+4)$

D. $y = -\frac{1}{10}x$msup$(x+4)$

Question ID 7248d5be

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 7248d5be



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 e7696b61

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: e7696b61

x	$f(x)$
-1	10
0	14
1	20

For the quadratic function f, the table shows three values of x and their corresponding values of $f(x)$. Which equation defines f?

A. $f(x) = 3x^2 + 3x + 14$

B. $f(x) = 5x^2 + x + 14$

C. $f(x) = 9x^2 - x + 14$

D. $f(x) = x^2 + 5x + 14$

Question ID 0f0a515f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 0f0a515f

The function p is defined by $p(n) = 7n^3$. What is the value of n when $p(n)$ is equal to 56?

A. 2

B. $\frac{8}{3}$

C. 7

D. 8

Question ID 25683f71

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 25683f71

$$g(x) = x^2 + 55$$

What is the minimum value of the given function?

A. 0

B. 55

C. 110

D. $3{,}025$

Question ID ddcbf768

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: ddcbf768

A model predicts that the population of Bergen was $15{,}000$ in 2005. The model also predicts that each year for the next 5 years, the population p increased by 4% of the previous year's population. Which equation best represents this model, where x is the number of years after 2005, for $x \leq 5$?

A. $p = 0.96$msup

B. $p = 1.04$msup

C. $p = 15{,}000$msup

D. $p = 15{,}000$msup

Question ID ed5ae6c5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: ed5ae6c5

What is an *x*-coordinate of an *x*-intercept of the graph of $y = 3(x - 14)(x + 5)(x + 4)$ in the *xy*-plane?

Question ID 5513928b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 5513928b

The product of two positive integers is 546. If the first integer is 11 greater than twice the second integer, what is the smaller of the two integers?

A. 7

B. 14

C. 39

D. 78

Question ID b8886c77

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: b8886c77

For the exponential function f, the value of $f(0)$ is c, where c is a constant. Of the following equations that define the function f, which equation shows the value of c as the coefficient or the base?

A. $f(x) = 22(1.5)^{x+1}$

B. $f(x) = 33(1.5)^{x}$

C. $f(x) = 49.5(1.5)^{x-1}$

D. $f(x) = 74.25(1.5)^{x-2}$

Question ID f42cbe82

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: f42cbe82

$$f(t) = 500(0.5)^{\frac{t}{12}}$$

The function f models the intensity of an X-ray beam, in number of particles in the X-ray beam, t millimeters below the surface of a sample of iron. According to the model, what is the estimated number of particles in the X-ray beam when it is at the surface of the sample of iron?

A. 500

B. 12

C. 5

D. 2

Question ID 60758fea

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 60758fea

The function f is defined by $f(x) = 4x^{-1}$. What is the value of $f(21)$?

A. -84

B. $\frac{1}{84}$

C. $\frac{4}{21}$

D. $\frac{21}{4}$

Question ID 3aaf7740

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 3aaf7740

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. $d = 0.006$msup

B. $d = 670$msup

C. $d =$ msup

D. $d =$ msup

Question ID b782b8f9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: b782b8f9

The function f is defined by $f(x) = |x - 4x|$. What value of a satisfies $f(5) - f(a) = -15$?

A. -20

B. 5

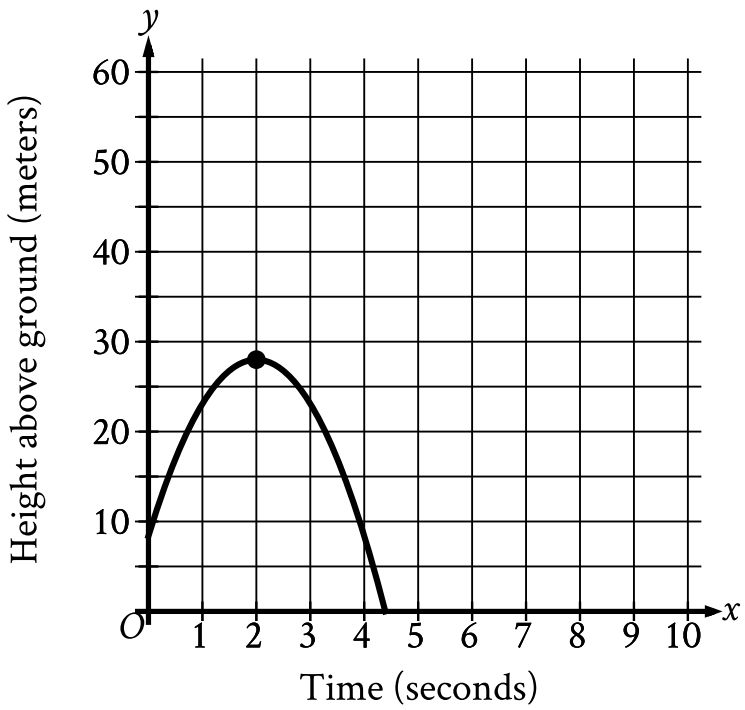
C. 10

D. 45

Question ID 28a57ae5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 28a57ae5



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 b9dc1baa

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: b9dc1baa

The function $f(t) = 60{,}000(2)^{\frac{t}{410}}$ gives the number of bacteria in a population t minutes after an initial observation. How much time, in minutes, does it take for the number of bacteria in the population to double?

Question ID 9e0f5f44

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 9e0f5f44

The function f is defined by $f(x) = 8x^3 + 4$. What is the value of $f(2)$?

Question ID 06ee10bb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 06ee10bb

A company opens an account with an initial balance of $\$36{,}100.00$. The account earns interest, and no additional deposits or withdrawals are made. The account balance is given by an exponential function A, where $A(t)$ is the account balance, in dollars, t years after the account is opened. The account balance after 13 years is $\$68{,}071.93$. Which equation could define A?

A. $A(t) = 36{,}100.00(1.05)^t$

B. $A(t) = 31{,}971.93(1.05)^t$

C. $A(t) = 31{,}971.93(0.05)^t$

D. $A(t) = 36{,}100.00(0.05)^t$

Question ID e9fc3093

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: e9fc3093

An object is kicked from a platform. The equation $h = -4.9t^2 + 7t + 9$ represents this situation, where h is the height of the object above the ground, in meters, t seconds after it is kicked. Which number represents the height, in meters, from which the object was kicked?

A. 0

B. 4.9

C. 7

D. 9

Question ID 17f72638

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 17f72638

A rectangle has a length that is 15 times its width. The function $y = (15w)(w)$ represents this situation, where y is the area, in square feet, of the rectangle and $y > 0$. Which of the following is the best interpretation of $15w$ in this context?

A. The length of the rectangle, in feet

B. The area of the rectangle, in square feet

C. The difference between the length and the width of the rectangle, in feet

D. The width of the rectangle, in feet

Question ID 77899762

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: 77899762

$$y = 0.25x^2 - 7.5x + 90.25$$

The equation gives the estimated stock price y, in dollars, for a certain company x days after a new product launched, where $0 \leq x \leq 20$. Which statement is the best interpretation of $(x, y) = (1, 83)$ in this context?

A. The company's estimated stock price increased $\$83$ every day after the new product launched.

B. The company's estimated stock price increased $\$1$ every 83 days after the new product launched.

C. 1 day after the new product launched, the company's estimated stock price is $\$83$.

D. 83 days after the new product launched, the company's estimated stock price is $\$1$.

Question ID e65d34a5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: e65d34a5

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 b465f388

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Medium

ID: b465f388

A physics class is planning an experiment about a toy rocket. The equation $y = -16(x - 5.6)^2 + 502$ gives the estimated height y, in feet, of the toy rocket x seconds after it is launched into the air. Which of the following is the best interpretation of the vertex of the graph of the equation in the *xy*-plane?

A. This toy rocket reaches an estimated maximum height of 502 feet 16 seconds after it is launched into the air.

B. This toy rocket reaches an estimated maximum height of 502 feet 5.6 seconds after it is launched into the air.

C. This toy rocket reaches an estimated maximum height of 16 feet 502 seconds after it is launched into the air.

D. This toy rocket reaches an estimated maximum height of 5.6 feet 502 seconds after it is launched into the air.