Question ID 8e3878fd

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

ID: 8e3878fd

$$P(t) = 1{,}800(1.02)^t$$

The function P gives the estimated number of marine mammals in a certain area, where t is the number of years since a study began. What is the best interpretation of $P(0) = 1{,}800$ in this context?

A. The estimated number of marine mammals in the area was 102 when the study began.

B. The estimated number of marine mammals in the area was $1{,}800$ when the study began.

C. The estimated number of marine mammals in the area increased by 102 each year during the study.

D. The estimated number of marine mammals in the area increased by $1{,}800$ each year during the study.

ID: 8e3878fd Answer

Correct Answer: B

Rationale

Choice B is correct. The function P gives the estimated number of marine mammals in a certain area, where t is the number of years since a study began. Since the value of $P(0)$ is the value of $P(t)$ when $t = 0$, it follows that $P(0) = 1{,}800$ means that the value of $P(t)$ is $1{,}800$ when $t = 0$. Since t is the number of years since the study began, it follows that $t = 0$ is 0 years since the study began, or when the study began. Therefore, the best interpretation of $P(0) = 1{,}800$ in this context is the estimated number of marine mammals in the area was $1{,}800$ when the study began.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID d08a5d15

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

ID: d08a5d15

The function f is defined by $f(x) = 5x^2$. What is the value of $f(8)$?

A. 40

B. 50

C. 80

D. 320

ID: d08a5d15 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the function f is defined by $f(x) = 5x^2$. Substituting 8 for x in $f(x) = 5x^2$ yields $f(8) = 5(8)^2$, which is equivalent to $f(8) = 5(64)$, or $f(8) = 320$. Therefore, the value of $f(8)$ is 320.

Choice A is incorrect. This is the value of $f(8)$ if $f(x) = 5x$.

Choice B is incorrect. This is the value of $f(8)$ if $f(x) = 5(x + 2)$.

Choice C is incorrect. This is the value of $f(8)$ if $f(x) = (5x)(2)$.

Question Difficulty: Easy

Question ID 21be3fbd

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

ID: 21be3fbd

The function g is defined by $g(x) = |x + 18|$. What is the value of $g(4)$?

A. -18

B. -4

C. 14

D. 22

ID: 21be3fbd Answer

Correct Answer: D

Rationale

Choice D is correct. The value of $g(4)$ is the value of $g(x)$ when $x = 4$. Substituting 4 for x in the given equation yields $g(4) = |4 + 18|$, which is equivalent to $g(4) = |22|$, or $g(4) = 22$. Therefore, the value of $g(4)$ is 22.

Choice A is incorrect. This would be the value of $g(4)$ if function g was defined by $g(x) = -|18|$, not $g(x) = |x + 18|$.

Choice B is incorrect. This would be the value of $g(4)$ if function g was defined by $g(x) = -|x|$, not $g(x) = |x + 18|$.

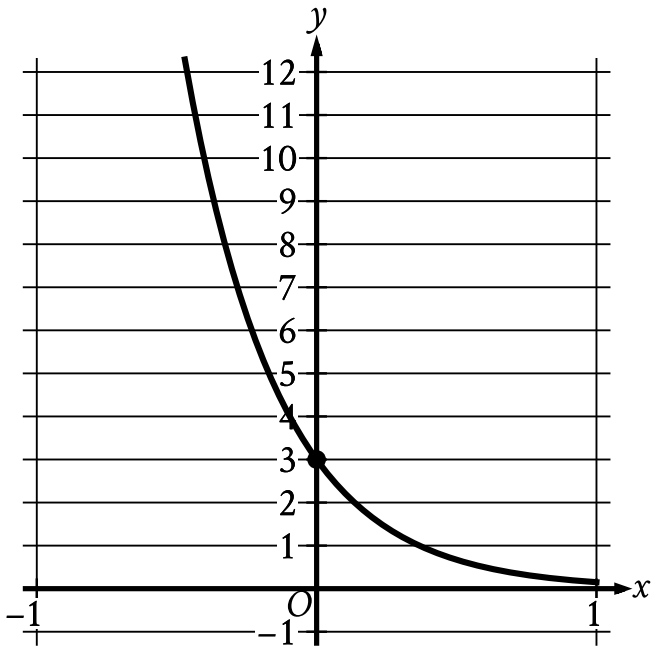
Choice C is incorrect. This would be the value of $g(4)$ if function g was defined by $g(x) = |-x + 18|$, not $g(x) = |x + 18|$.

Question Difficulty: Easy

Question ID feea2bbd

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

ID: feea2bbd



The graph of the exponential function f is shown, where $y = f(x)$. The *y*-intercept of the graph is $(0, y)$. What is the value of y?

ID: feea2bbd Answer

Correct Answer: 3

Rationale

The correct answer is 3. It's given that the *y*-intercept of the graph shown is $(0, y)$. The graph passes through the point $(0, 3)$. Therefore, the value of y is 3.

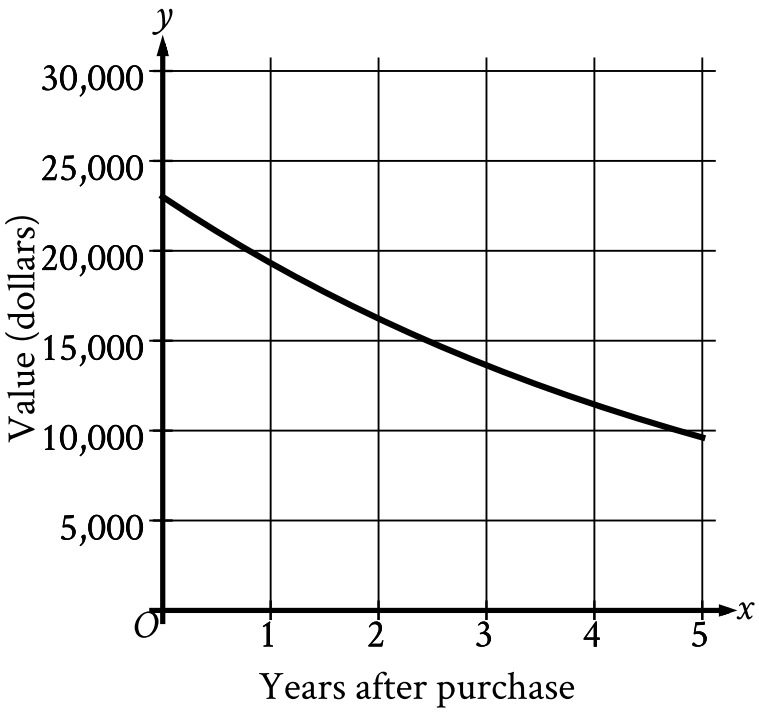
Question Difficulty: Easy

Question ID ba5a8050

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

ID: ba5a8050

The graph shows the predicted value y, in dollars, of a certain sport utility vehicle x years after it is first purchased.



Which of the following is closest to the predicted value of the sport utility vehicle 3 years after it is first purchased?

A. $\$9{,}619$

B. $\$13{,}632$

C. $\$19{,}320$

D. $\$23{,}000$

ID: ba5a8050 Answer

Correct Answer: B

Rationale

Choice B is correct. For the graph shown, the horizontal axis represents the number of years after a certain sport utility vehicle is first purchased, and the vertical axis represents the predicted value, in dollars, of the sport utility vehicle. According to the graph, 3 years after the sport utility vehicle is purchased, the predicted value of the sport utility vehicle is between $\$10{,}000$ and $\$15{,}000$. Of the given choices, only $\$13{,}632$ is between $\$10{,}000$ and $\$15{,}000$. Therefore, $\$13{,}632$ is closest to the predicted value of the sport utility vehicle 3 years after it is first purchased.

Choice A is incorrect. This is closest to the predicted value of the sport utility vehicle 5 years after it is first purchased.

Choice C is incorrect. This is closest to the predicted value of the sport utility vehicle 1 year after it is first purchased.

Choice D is incorrect. This is closest to the predicted value of the sport utility vehicle when it is first purchased.

Question Difficulty: Easy

Question ID e2abeaa7

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

ID: e2abeaa7

The function f is defined by $f(x) = x^3 + 9$. What is the value of $f(2)$?

A. 14

B. 15

C. 17

D. 18

ID: e2abeaa7 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that $f(x) = x^3 + 9$. Substituting 2 for x in this equation yields $f(2) = (2)^3 + 9$. This is equivalent to $f(2) = 8 + 9$, or $f(2) = 17$.

Choice A is incorrect. This is the value of $2 + 3 + 9$, not $2^3 + 9$.

Choice B is incorrect. This is the value of $2(3) + 9$, not $2^3 + 9$.

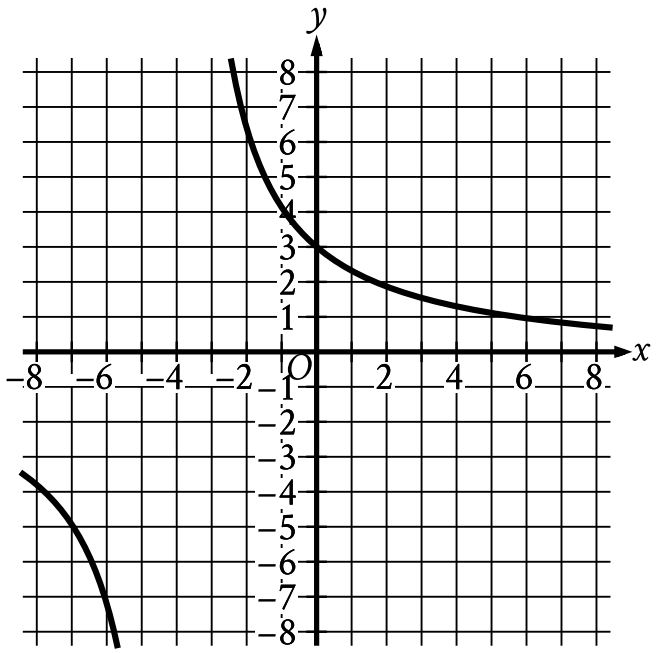
Choice D is incorrect. This is the value of $3^2 + 9$, not $2^3 + 9$.

Question Difficulty: Easy

Question ID 506336f9

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

ID: 506336f9



The graph of $y = f(x)$ is shown in the *xy*-plane. The value of $f(0)$ is an integer. What is the value of $f(0)$?

ID: 506336f9 Answer

Correct Answer: 3

Rationale

The correct answer is 3. The value of $f(0)$ is the value of y on the graph of $y = f(x)$ in the *xy*-plane that corresponds with $x = 0$. It's given that the value of $f(0)$ is an integer. For the graph of $y = f(x)$ shown, when $x = 0$, the corresponding integer value of y is 3. Therefore, the value of $f(0)$ is 3.

Question Difficulty: Easy

Question ID dabcd1a8

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

ID: dabcd1a8

$$y = -\frac{1}{4}x^2 + 2x + 29$$

The given equation models a company's scheduled deliveries over 8 months, where y is the estimated number of scheduled deliveries x months after the end of May 2012, where $0 \leq x \leq 8$. Which statement is the best interpretation of the *y*-intercept of the graph of this equation in the *xy*-plane?

A. At the end of May 2012, the estimated number of scheduled deliveries was 0.

B. At the end of May 2012, the estimated number of scheduled deliveries was 29.

C. At the end of June 2012, the estimated number of scheduled deliveries was 0.

D. At the end of June 2012, the estimated number of scheduled deliveries was 29.

ID: dabcd1a8 Answer

Correct Answer: B

Rationale

Choice B is correct. The *y*-intercept of a graph in the *xy*-plane is the point where $x = 0$. For the given equation, the *y*-intercept of the graph in the *xy*-plane can be found by substituting 0 for x in the equation, which yields $y = -\frac{1}{4}(0)^2 + 2(0) + 29$, or $y = 29$. Therefore, the *y*-intercept of the graph is $(0, 29)$. It's given that y is the estimated number of scheduled deliveries x months after the end of May 2012. Therefore, $x = 0$ represents 0 months after the end of May 2012, or the end of May 2012. Thus, the best interpretation of the *y*-intercept of the graph of this equation in the *xy*-plane is that at the end of May 2012, the estimated number of scheduled deliveries was 29.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID c3018583

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

ID: c3018583

A ball is dropped from an initial height of 22 feet and bounces off the ground repeatedly. The function h estimates that the maximum height reached after each time the ball hits the ground is 85% of the maximum height reached after the previous time the ball hit the ground. Which equation defines h, where $h(n)$ is the estimated maximum height of the ball after it has hit the ground n times and n is a whole number greater than 1 and less than 10?

A. $h(n) = 22(0.22)^n$

B. $h(n) = 22(0.85)^n$

C. $h(n) = 85$msup

D. $h(n) = 85(0.85)^n$

ID: c3018583 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that for the function h, $h(n)$ is the estimated maximum height, in feet, of the ball after it has hit the ground n times. It's also given that the function h estimates that the maximum height reached after each time the ball hits the ground is 85% of the maximum height reached after the previous time the ball hit the ground. It follows that h is a decreasing exponential function that can be written in the form $h(n) = a\left(\frac{p}{100}\right)^n$, where a is the initial height, in feet, the ball was dropped from and the function estimates that the maximum height reached after each time the ball hits the ground is $p\%$ of the maximum height reached after the previous time the ball hit the ground. It's given that the ball is dropped from an initial height of 22 feet. Therefore, $a = 22$. Since the function h estimates that the maximum height reached after each time the ball hits the ground is 85% of the maximum height reached after the previous time the ball hit the ground, $p = 85$. Substituting 22 for a and 85 for p in the equation $h(n) = a\left(\frac{p}{100}\right)^n$ yields $h(n) = 22\left(\frac{85}{100}\right)^n$, or $h(n) = 22(0.85)^n$.

Choice A is incorrect. This function estimates that the maximum height reached after each time the ball hits the ground is 22%, not 85%, of the maximum height reached after the previous time the ball hit the ground.

Choice C is incorrect. This function estimates that the ball is dropped from an initial height of 85 feet, not 22 feet, and that the maximum height reached after each time the ball hits the ground is 22%, not 85%, of the maximum height reached after the previous time the ball hit the ground.

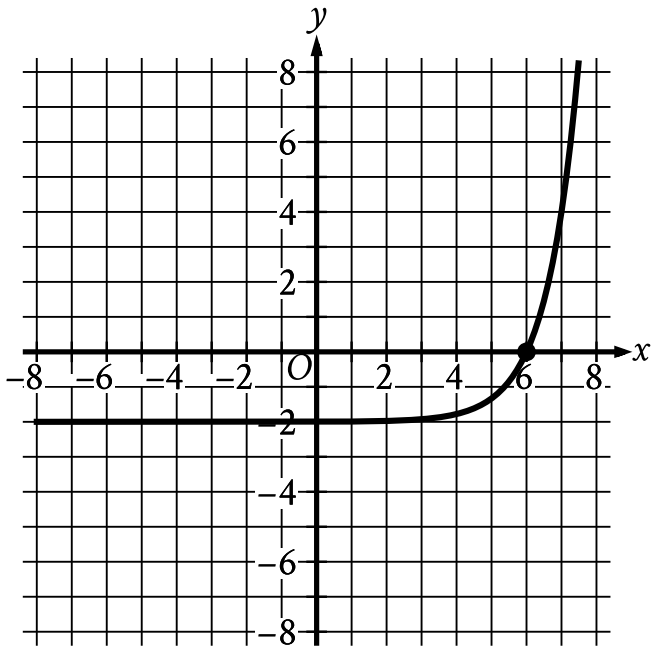
Choice D is incorrect. This function estimates that the ball is dropped from an initial height of 85 feet, not 22 feet.

Question Difficulty: Easy

Question ID 71dfd66d

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

ID: 71dfd66d



What is the *x*-coordinate of the *x*-intercept of the graph shown?

ID: 71dfd66d Answer

Correct Answer: 6

Rationale

The correct answer is 6. An *x*-intercept of a graph is a point on the graph where it intersects the *x*-axis, or where the value of y is 0. The graph shown intersects the *x*-axis at the point $(6, 0)$. Therefore, the *x*-coordinate of the *x*-intercept of the graph shown is 6.

Question Difficulty: Easy

Question ID 32f0047f

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

ID: 32f0047f

$$P(t) = 24.8(1.036)^t$$

The function P gives the predicted population, in millions, of a certain country for the period from 1984 to 2018, where t is the number of years after 1984. According to the model, what is the best interpretation of the statement "$P(8)$ is approximately equal to 32.91"?

A. In 1984, the predicted population of this country was approximately 8 million.

B. In 1984, the predicted population of this country was approximately 32.91 million.

C. 8 years after 1984, the predicted population of this country was approximately 32.91 million.

D. 32.91 years after 1984, the predicted population of this country was approximately 8 million.

ID: 32f0047f Answer

Correct Answer: C

Rationale

Choice C is correct. The function P gives the predicted population, in millions, of a certain country for the period from 1984 to 2018, where t is the number of years after 1984. Since the value of $P(8)$ is the value of $P(t)$ when $t = 8$, it follows that "$P(8)$ is approximately equal to 32.91" means that the value of $P(t)$ is approximately equal to 32.91 when $t = 8$. Therefore, the best interpretation of the statement "$P(8)$ is approximately equal to 32.91" is that 8 years after 1984, the predicted population of this country was approximately 32.91 million.

Choice A is incorrect. In 1984, the predicted population of this country was 24.8 million, not approximately 8 million.

Choice B is incorrect. In 1984, the predicted population of this country was 24.8 million, not approximately 32.91 million.

Choice D is incorrect. 32.91 years after 1984, the predicted population of this country was $24.8(1.036)^{32.91}$ million, or approximately 79.42 million, not approximately 8 million.

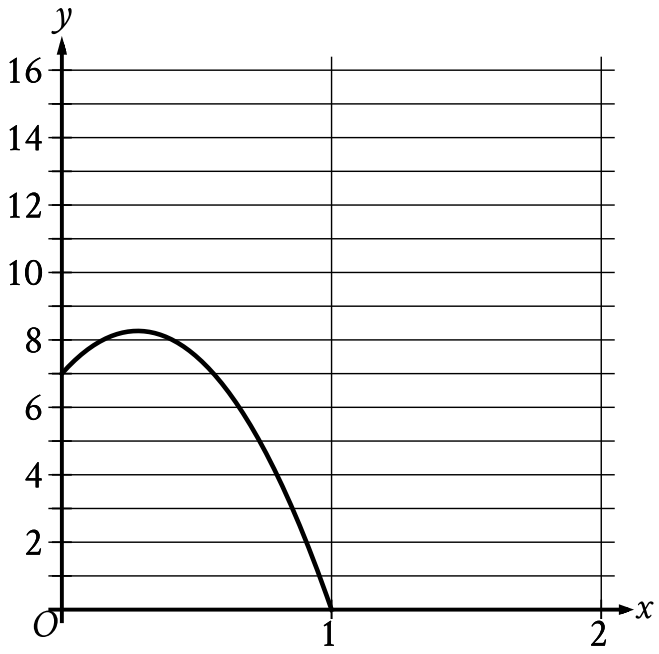
Question Difficulty: Easy

Question ID 5a0d5e4b

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

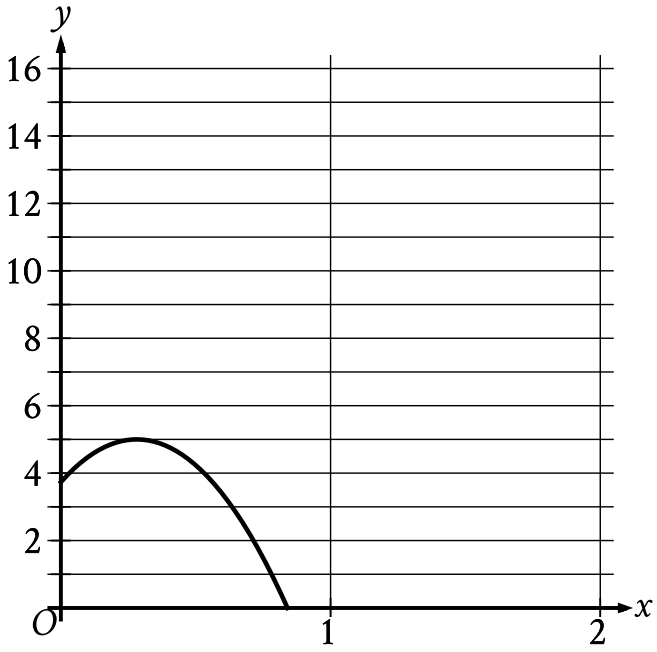
ID: 5a0d5e4b

During the first part of an experiment, a ball was launched from a 7-foot-tall platform. The graph shows the height y, in feet, of the ball x seconds after it was launched during the first part of the experiment.

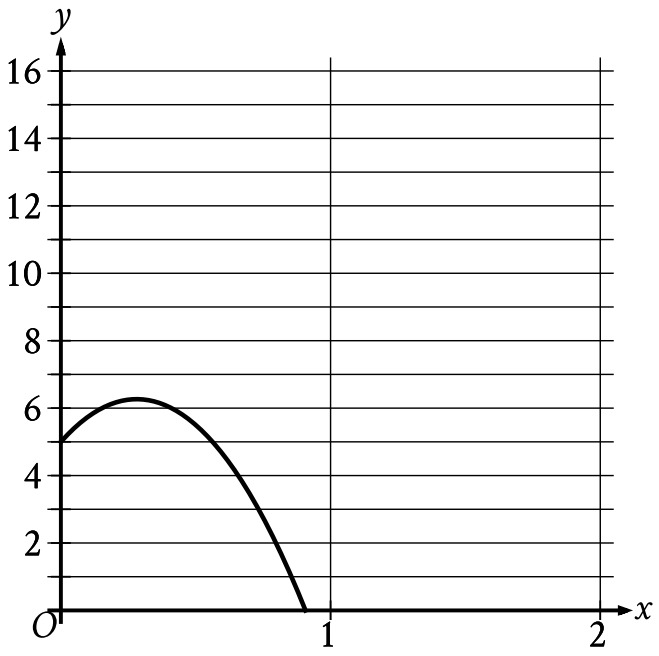


During the second part of the experiment, the ball was launched the same way, but from a platform that is 2 feet shorter than the first platform. Which of the following graphs could represent the height y, in feet, of the ball x seconds after it was launched during the second part of the experiment?

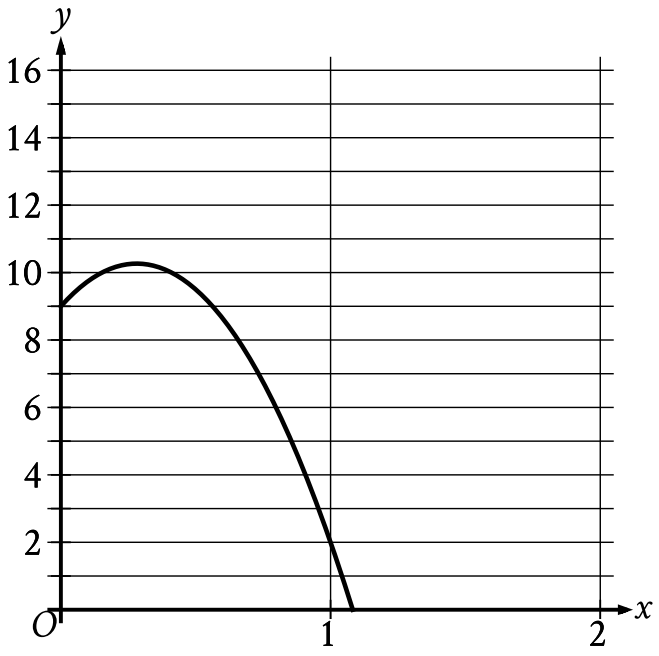
A.



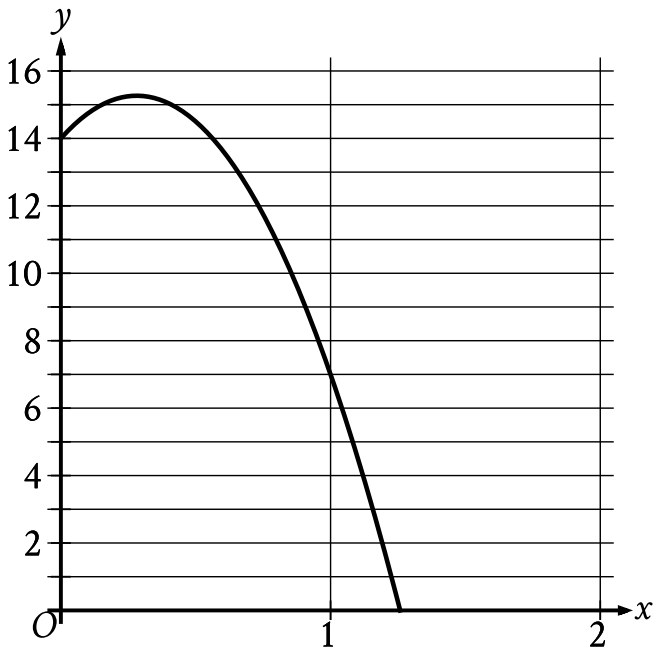
B.



C.



D.



ID: 5a0d5e4b Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that y represents the height, in feet, of the ball x seconds after it was launched. It's also given that during the first part of an experiment, a ball was launched from a 7-foot-tall platform. Therefore, the *y*-coordinate of the *y*-intercept of the given graph, 7, represents the platform height, in feet. During the second part of the experiment, the platform the ball was launched from was 2 feet shorter than the platform in the first part of the experiment. It follows that the height of the platform in the second part of the experiment was $7 - 2$ feet, or 5 feet. Therefore, the *y*-coordinate of the *y*-intercept of the graph representing the second part of the experiment must be 5. Only choice B satisfies this condition.

Choice A is incorrect. This could represent the graph if the ball were launched from a platform that was about 3 feet shorter rather than 2 feet shorter.

Choice C is incorrect. This could represent the graph if the ball were launched from a platform that was 2 feet taller rather than 2 feet shorter.

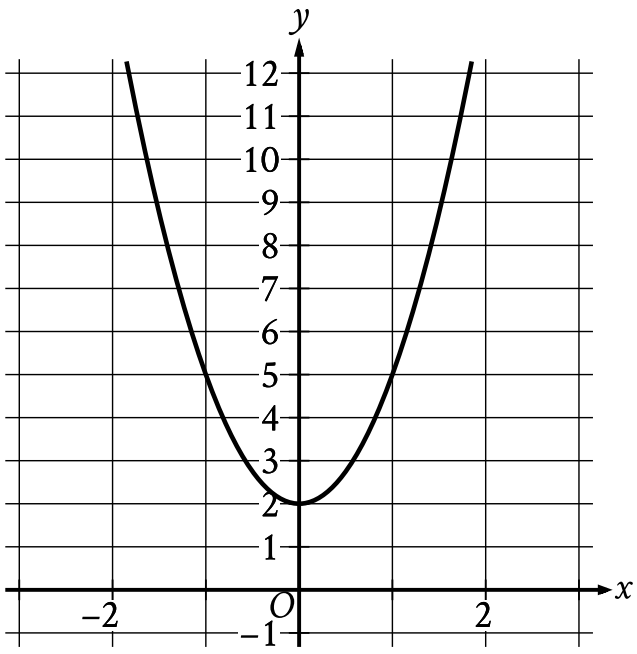
Choice D is incorrect. This could represent the graph if the ball were launched from a platform that was twice as tall rather than 2 feet shorter.

Question Difficulty: Easy

Question ID 0b95a3c1

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

ID: 0b95a3c1



The graph of the quadratic function $y = f(x)$ is shown. What is the vertex of the graph?

A. $(0, -2)$

B. $(0, -3)$

C. $(0, 2)$

D. $(0, 3)$

ID: 0b95a3c1 Answer

Correct Answer: C

Rationale

Choice C is correct. The vertex of the graph of a quadratic function in the *xy*-plane is the point at which the graph is either at its minimum or maximum *y*-value. In the graph shown, the minimum *y*-value occurs at the point $(0, 2)$.

Choice A is incorrect. The graph shown doesn't pass through the point $(0, -2)$.

Choice B is incorrect. The graph shown doesn't pass through the point $(0, -3)$.

Choice D is incorrect. The graph shown doesn't pass through the point $(0, 3)$.

Question Difficulty: Easy

Question ID e00137af

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

ID: e00137af

The function g is defined by $g(x) = x^2 + 9$. For which value of x is $g(x) = 25$?

A. 4

B. 5

C. 9

D. 13

ID: e00137af Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that $g(x) = x^2 + 9$. Substituting 25 for $g(x)$ in this equation yields $25 = x^2 + 9$. Subtracting 9 from both sides of this equation yields $16 = x^2$. Taking the square root of each side of this equation yields $x = \pm 4$. It follows that $g(x) = 25$ when the value of x is 4 or -4. Only 4 is listed among the choices.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

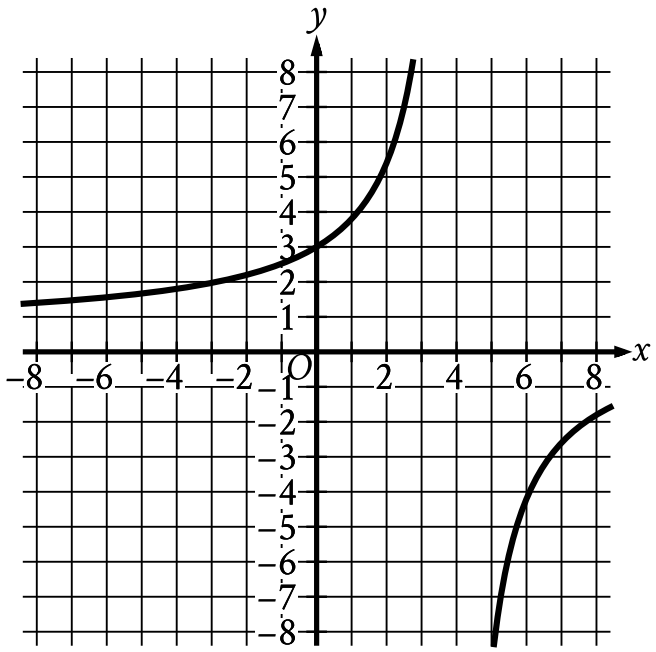
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID 7f26b325

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

ID: 7f26b325



The graph of $y = f(x)$ is shown in the *xy*-plane. What is the value of $f(0)$?

A. -3

B. 0

C. $\frac{3}{5}$

D. 3

ID: 7f26b325 Answer

Correct Answer: D

Rationale

Choice D is correct. Because the graph of $y = f(x)$ is shown, the value of $f(0)$ is the value of y on the graph that corresponds with $x = 0$. When $x = 0$, the corresponding value of y is 3. Therefore, the value of $f(0)$ is 3.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

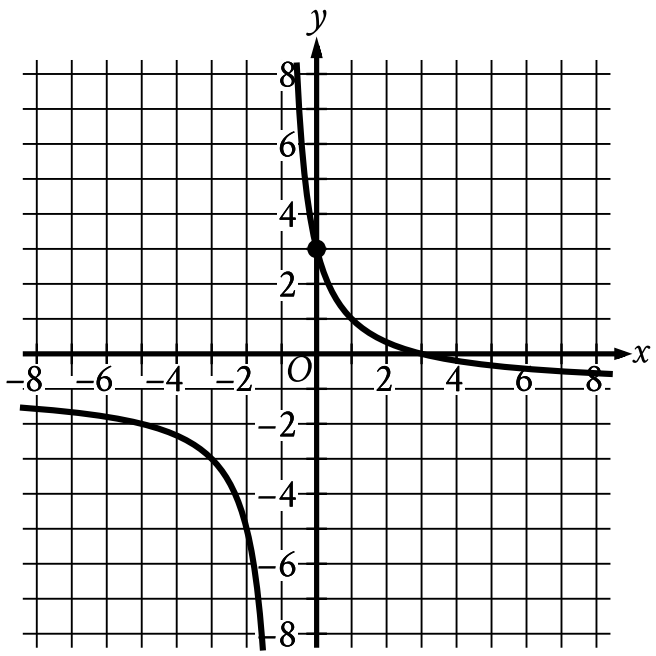
Choice C is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 49f6315b

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

ID: 49f6315b



What is the *y*-coordinate of the *y*-intercept of the graph shown?

ID: 49f6315b Answer

Correct Answer: 3

Rationale

The correct answer is 3. A *y*-intercept of a graph in the *xy*-plane is a point (x, y) on the graph where $x = 0$. For the graph shown, at $x = 0$, the corresponding value of y is 3. Therefore, the *y*-coordinate of the *y*-intercept of the graph shown is 3.

Question Difficulty: Easy

Question ID 14a9a45d

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

ID: 14a9a45d

The function f is defined by $f(x) = \frac{1}{6x}$. What is the value of $f(x)$ when $x = 3$?

A. $\frac{1}{3}$

B. $\frac{1}{6}$

C. $\frac{1}{9}$

D. $\frac{1}{18}$

ID: 14a9a45d Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that $f(x) = \frac{1}{6x}$. Substituting 3 for x in this equation yields $f(3) = \frac{1}{6(3)}$, or $f(3) = \frac{1}{18}$. Therefore, when $x = 3$, the value of $f(x)$ is $\frac{1}{18}$.

Choice A is incorrect. This is the value of $f(x)$ when $x = 0.5$.

Choice B is incorrect. This is the value of $f(x)$ when $x = 1$.

Choice C is incorrect. This is the value of $f(x)$ when $x = 1.5$.

Question Difficulty: Easy

Question ID 74b8e0a0

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

ID: 74b8e0a0

The function f is defined by $f(x) = \frac{16}{x}$. What is the value of $f(x)$ when $x = 17$?

A. $\frac{16}{17}$

B. $\frac{17}{16}$

C. 16

D. 17

ID: 74b8e0a0 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that $f(x) = \frac{16}{x}$. Substituting 17 for x in this function yields $f(17) = \frac{16}{17}$. Therefore, when $x = 17$, the value of $f(x)$ is $\frac{16}{17}$.

Choice B is incorrect. This is the value of the reciprocal of $f(x)$ when $x = 17$.

Choice C is incorrect. This is the value of $f(x)$ when $x = 1$.

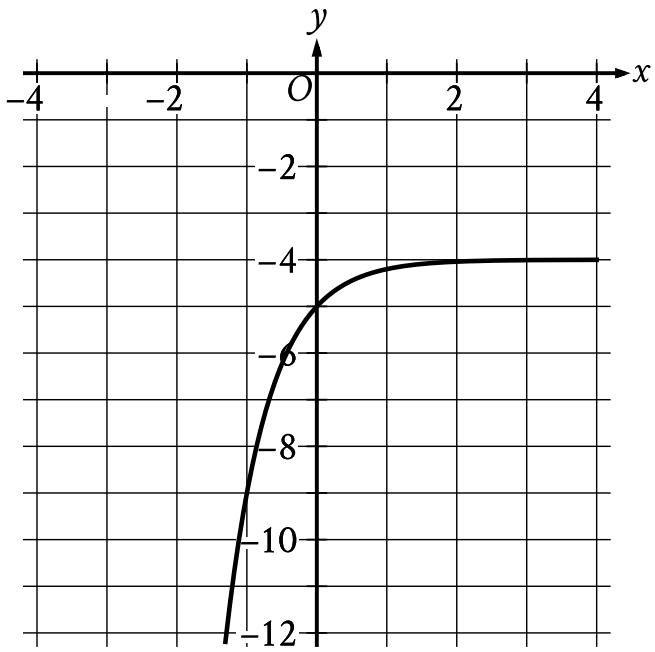
Choice D is incorrect. This is the value of x when $x = 17$.

Question Difficulty: Easy

Question ID 9322d5de

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

ID: 9322d5de



What is the y-intercept of the graph shown?

A. $(-1, -9)$

B. $(0, -5)$

C. $(0, -4)$

D. $(0, 0)$

ID: 9322d5de Answer

Correct Answer: B

Rationale

Choice B is correct. The *y*-intercept of a graph in the *xy*-plane is the point (x, y) on the graph where $x = 0$. At $x = 0$, the corresponding value of y is -5. Therefore, the *y*-intercept of the graph shown is $(0, -5)$.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect. This is the *y*-intercept of a graph in the *xy*-plane that intersects the *y*-axis at $y = -4$, not $y = -5$.

Choice D is incorrect. This is the *y*-intercept of a graph in the *xy*-plane that intersects the *y*-axis at $y = 0$, not $y = -5$.

Question Difficulty: Easy

Question ID bb4474ea

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

ID: bb4474ea

The function f is defined by $f(x) = 10x^2 - 32x - 152$. What is the value of $f(0)$?

A. -152

B. -32

C. 0

D. 10

ID: bb4474ea Answer

Correct Answer: A

Rationale

Choice A is correct. The value of $f(0)$ is the value of $f(x)$ when $x = 0$. The function f is defined by $f(x) = 10x^2 - 32x - 152$. Substituting 0 for x in this equation yields $f(0) = 10(0)^2 - 32(0) - 152$. This equation can be rewritten as $f(0) = 10(0) - 0 - 152$, or $f(0) = -152$. Therefore, the value of $f(0)$ is -152.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID 5964ec17

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

ID: 5964ec17

The function f is defined by $f(x) = x^2 + x + 71$. What is the value of $f(2)$?

ID: 5964ec17 Answer

Correct Answer: 77

Rationale

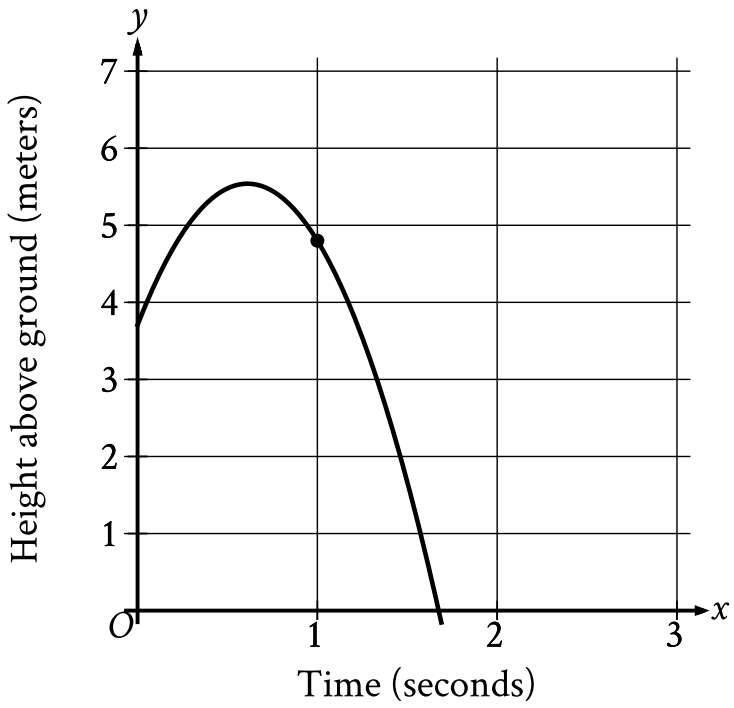
The correct answer is 77. It's given that the function f is defined by $f(x) = x^2 + x + 71$. Substituting 2 for x in function f yields $f(2) = (2)^2 + 2 + 71$, which is equivalent to $f(2) = 4 + 2 + 71$, or $f(2) = 77$. Therefore, the value of $f(2)$ is 77.

Question Difficulty: Easy

Question ID 67906a7c

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

ID: 67906a7c



The graph shows the height above ground, in meters, of a ball x seconds after the ball was launched upward from a platform. Which statement is the best interpretation of the marked point $(1.0, 4.8)$ in this context?

A. 1.0 second after being launched, the ball's height above ground is 4.8 meters.

B. 4.8 seconds after being launched, the ball's height above ground is 1.0 meter.

C. The ball was launched from an initial height of 1.0 meter with an initial velocity of 4.8 meters per second.

D. The ball was launched from an initial height of 4.8 meters with an initial velocity of 1.0 meter per second.

ID: 67906a7c Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the graph shows the height above ground, in meters, of a ball x seconds after the ball was launched upward from a platform. In the graph shown, the *x*-axis represents time, in seconds, and the *y*-axis represents the height of the ball above ground, in meters. It follows that for the marked point $(1.0, 4.8)$, 1.00 represents the time, in seconds, after the ball was launched upward from a platform and 4.80 represents the height of the ball above ground, in meters. Therefore, the best interpretation of the marked point $(1.0, 4.8)$ is 1.00 second after being launched, the ball's height above ground is 4.80 meters.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 76bb62a9

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

ID: 76bb62a9

The function f is defined by $f(x) = 4 + \sqrt{x}$. What is the value of $f(144)$?

A. 0

B. 16

C. 40

D. 76

ID: 76bb62a9 Answer

Correct Answer: B

Rationale

Choice B is correct. The value of $f(144)$ is the value of $f(x)$ when $x = 144$. It's given that the function f is defined by $f(x) = 4 + \sqrt{x}$. Substituting 144 for x in this equation yields $f(144) = 4 + \sqrt{144}$. Since the positive square root of 144 is 12, it follows that this equation can be rewritten as $f(144) = 4 + 12$, or $f(144) = 16$. Therefore, the value of $f(144)$ is 16.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the value of $f(1{,}296)$, not $f(144)$.

Choice D is incorrect. This is the value of $f(5{,}184)$, not $f(144)$.

Question Difficulty: Easy

Question ID ec6f1063

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

ID: ec6f1063

The function g is defined by $g(x) = \sqrt{8x + 1}$. What is the value of $g(3)$?

A. $\frac{5}{8}$

B. $\frac{25}{8}$

C. 5

D. 25

ID: ec6f1063 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that the function g is defined by $g(x) = \sqrt{8x + 1}$. Substituting 3 for x in the given function yields $g(3) = \sqrt{8(3) + 1}$, which is equivalent to $g(3) = \sqrt{25}$, or $g(3) = 5$. Therefore, the value of $g(3)$ is 5.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

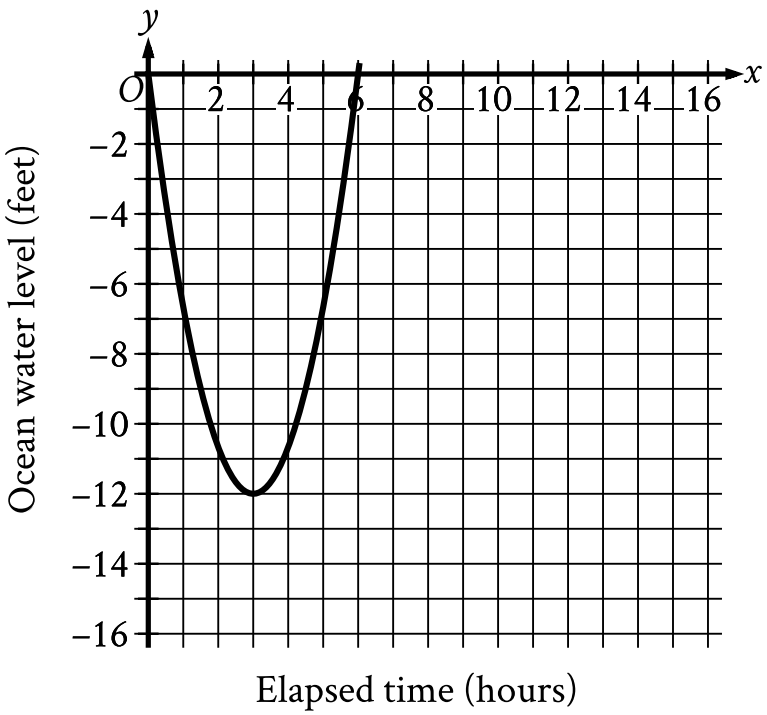
Choice D is incorrect. This is the value of $8(3) + 1$, not $\sqrt{8(3) + 1}$.

Question Difficulty: Easy

Question ID 1bb4e088

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

ID: 1bb4e088



Scientists recorded data about the ocean water levels at a certain location over a period of 6 hours. The graph shown models the data, where $y = 0$ represents sea level. Which table gives values of x and their corresponding values of y based on the model?

A.

x	y
0	−12
0	3
3	6

B.

x	y
0	0
3	12
0	−6

C.

x	y
0	0
3	−12

6	0

D.

x	y
0	0
12	3
-6	0

ID: 1bb4e088 Answer

Correct Answer: C

Rationale

Choice C is correct. Each point (x, y) on the graph represents an elapsed time x, in hours, and the corresponding ocean water level y, in feet, at a certain location based on the model. The graph shown passes through the points $(0, 0)$, $(3, -12)$, and $(6, 0)$. Thus, the table in choice C gives the values of x and their corresponding values of y based on the model.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

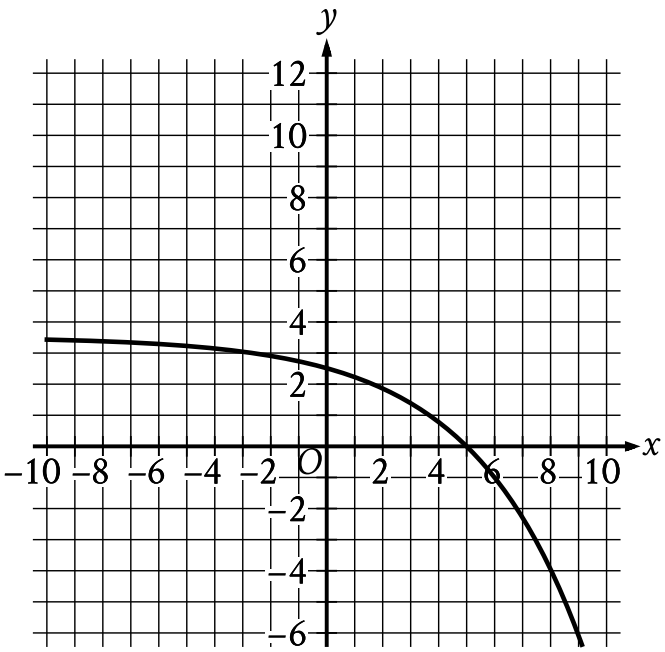
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID f89a2cb0

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

ID: f89a2cb0



What is the *x*-intercept of the graph shown?

A. $(-5, 0)$

B. $(5, 0)$

C. $(-2, 0)$

D. $(2, 0)$

ID: f89a2cb0 Answer

Correct Answer: B

Rationale

Choice B is correct. An *x*-intercept of a graph in the *xy*-plane is a point at which the graph crosses the *x*-axis. The graph shown crosses the *x*-axis at the point $(5, 0)$. Therefore, the *x*-intercept of the graph shown is $(5, 0)$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

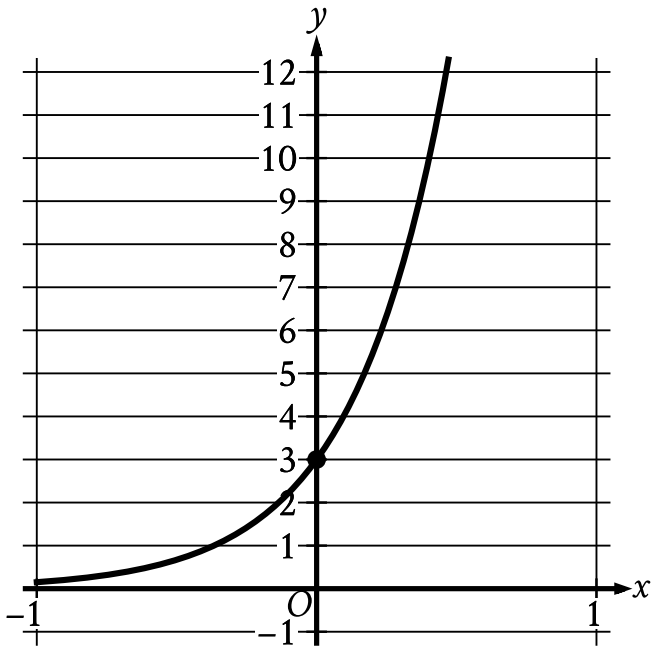
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID 066299f1

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

ID: 066299f1



The graph of the exponential function f is shown, where $y = f(x)$. The y-intercept of the graph is $(0, y)$. What is the value of y?

ID: 066299f1 Answer

Correct Answer: 3

Rationale

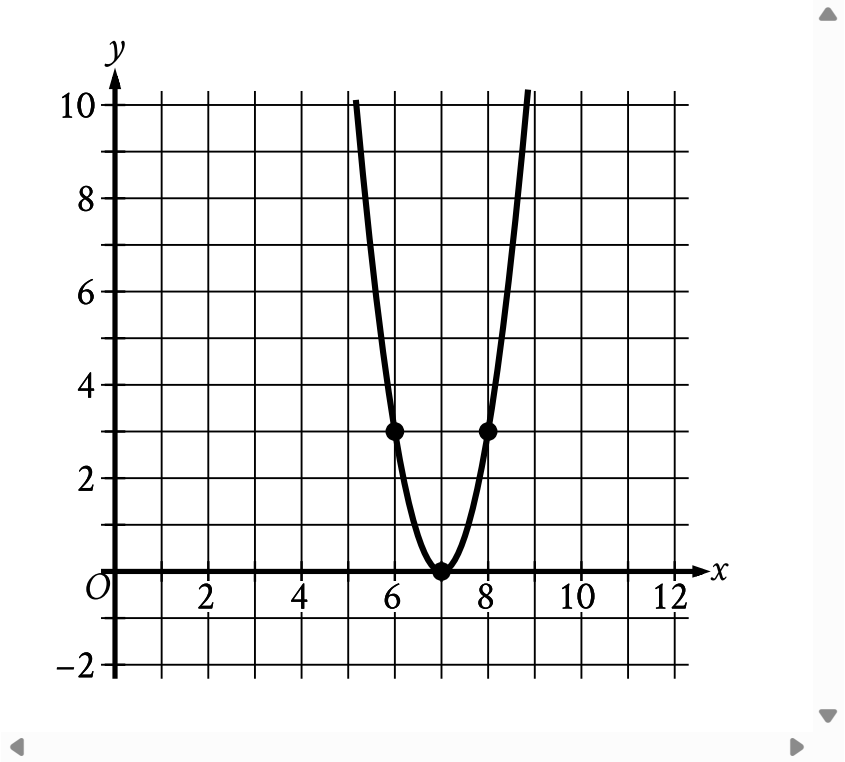
The correct answer is 3. For the graph of the exponential function f shown, where $y = f(x)$, it's given that the y-intercept of the graph is $(0, y)$. The graph intersects the y-axis at the point $(0, 3)$. Therefore, the value of y is 3.

Question Difficulty: Easy

Question ID afa732b9

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

ID: afa732b9



The *x*-intercept of the graph shown is $(x, 0)$. What is the value of x?

ID: afa732b9 Answer

Correct Answer: 7

Rationale

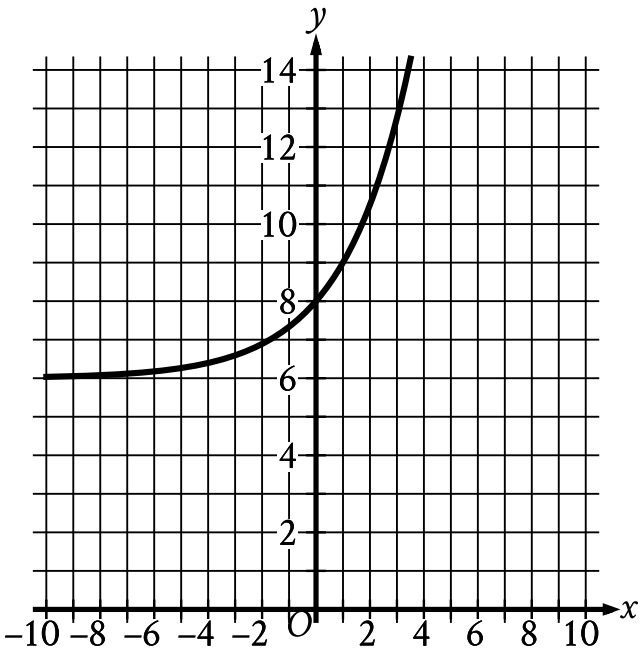
The correct answer is 7. It's given that the *x*-intercept of the graph shown is $(x, 0)$. The graph passes through the point $(7, 0)$. Therefore, the value of x is 7.

Question Difficulty: Easy

Question ID f8879c84

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

ID: f8879c84



What is the *y*-intercept of the graph shown?

A. $(-8, 0)$

B. $(-6, 0)$

C. $(0, 6)$

D. $(0, 8)$

ID: f8879c84 Answer

Correct Answer: D

Rationale

Choice D is correct. The *y*-intercept of a graph in the *xy*-plane is the point at which the graph crosses the *y*-axis. The graph shown crosses the *y*-axis at the point $(0, 8)$. Therefore, the *y*-intercept of the graph shown is $(0, 8)$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

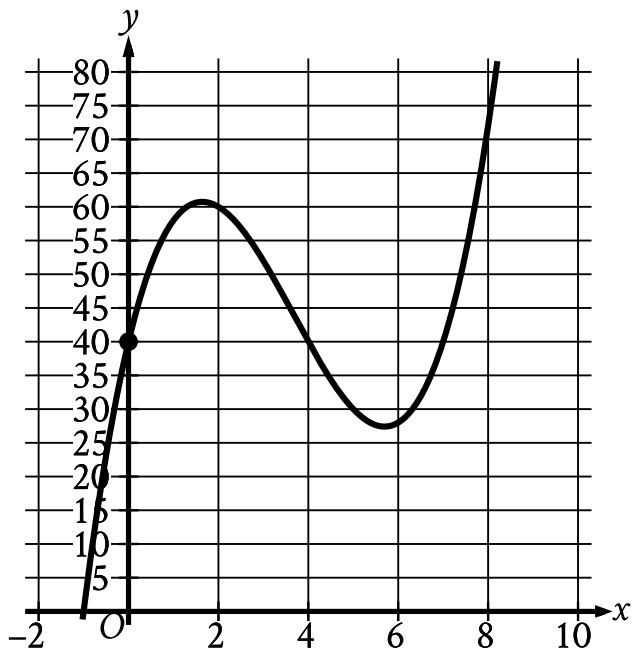
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID ff31d6d6

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

ID: ff31d6d6



The *y*-intercept of the graph shown is (x, y). What is the value of y?

ID: ff31d6d6 Answer

Correct Answer: 40

Rationale

The correct answer is 40. The *y*-intercept of a graph in the *xy*-plane is the point (x, y) on the graph where $x = 0$. The *y*-intercept of the graph shown is $(0, 40)$. Therefore, the value of y is 40.

Question Difficulty: Easy

Question ID a2786d4b

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

ID: a2786d4b

The function f is defined by $f(x) = 6 + \sqrt{x}$. What is the value of $f(36)$?

ID: a2786d4b Answer

Correct Answer: 12

Rationale

The correct answer is 12. The value of $f(36)$ is the value of $f(x)$ when $x = 36$. Substituting 36 for x in the given equation yields $f(36) = 6 + \sqrt{36}$, which is equivalent to $f(36) = 6 + 6$, or $f(36) = 12$. Thus, the value of $f(36)$ is 12.

Question Difficulty: Easy

Question ID 07173576

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

ID: 07173576

The function h is defined by $h(x) = \frac{8}{5x+6}$. What is the value of $h(2)$?

ID: 07173576 Answer

Correct Answer: .5, 1/2

Rationale

The correct answer is $\frac{1}{2}$. The value of $h(2)$ is the value of $h(x)$ when $x = 2$. Substituting 2 for x in the given equation yields $h(2) = \frac{8}{5(2)+6}$, which is equivalent to $h(2) = \frac{8}{16}$, or $h(2) = \frac{1}{2}$. Therefore, the value of $h(2)$ is $\frac{1}{2}$. Note that 1/2 and .5 are examples of ways to enter a correct answer.

Question Difficulty: Easy

Question ID d25b0c19

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

ID: d25b0c19

The function f is defined by $f(x) = x^3 + 15$. What is the value of $f(2)$?

A. 20

B. 21

C. 23

D. 24

ID: d25b0c19 Answer

Correct Answer: C

Rationale

Choice C is correct. The value of $f(2)$ is the value of $f(x)$ when $x = 2$. Substituting 2 for x in the given function yields $f(2) = (2)^3 + 15$, or $f(2) = 8 + 15$, which is equivalent to $f(2) = 23$. Therefore, the value of $f(2)$ is 23.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the value of $f(2)$ when $f(x) = x(3) + 15$, rather than $f(x) = x^3 + 15$.

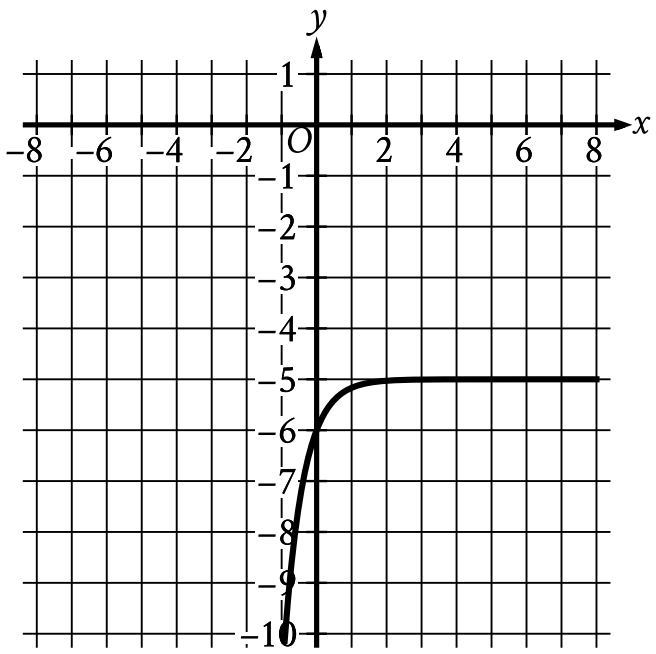
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID f4d12865

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

ID: f4d12865



What is the *y*-intercept of the graph shown?

A. $(0, -6)$

B. $(-6, 0)$

C. $(0, 0)$

D. $(-5, -5)$

ID: f4d12865 Answer

Correct Answer: A

Rationale

Choice A is correct. The *y*-intercept of a graph in the *xy*-plane is the point (x, y) on the graph where $x = 0$. For the graph shown, at $x = 0$, the corresponding value of *y* is -6. Therefore, the *y*-intercept of the graph shown is $(0, -6)$.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 8a3fa8c4

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

ID: 8a3fa8c4

The kinetic energy, in joules, of an object with mass 9 kilograms traveling at a speed of v meters per second is given by the function K, where $K(v) = \frac{9}{2}v^2$. Which of the following is the best interpretation of $K(34) = 5{,}202$ in this context?

A. The object traveling at 34 meters per second has a kinetic energy of $5{,}202$ joules.

B. The object traveling at 340 meters per second has a kinetic energy of $5{,}202$ joules.

C. The object traveling at $5{,}202$ meters per second has a kinetic energy of 34 joules.

D. The object traveling at $23{,}409$ meters per second has a kinetic energy of 34 joules.

ID: 8a3fa8c4 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the kinetic energy, in joules, of an object with a mass of 9 kilograms traveling at a speed of v meters per second is given by the function K, where $K(v) = \frac{9}{2}v^2$. It follows that in the equation $K(34) = 5{,}202$, 34 is the value of v, or the speed of the object, in meters per second, and $5{,}202$ is the kinetic energy, in joules, of the object at that speed. Therefore, the best interpretation of $K(34) = 5{,}202$ in this context is the object traveling at 34 meters per second has a kinetic energy of $5{,}202$ joules.

Choice B is incorrect. The object traveling at 340 meters per second has a kinetic energy of $520{,}200$ joules.

Choice C is incorrect. The object traveling at $5{,}202$ meters per second has a kinetic energy of $121{,}773{,}618$ joules.

Choice D is incorrect. The object traveling at $23{,}409$ meters per second has a kinetic energy of $2{,}465{,}915{,}764.5$ joules.

Question Difficulty: Easy

Question ID fb559c97

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

ID: fb559c97

The function $f(x) = 240{,}000(1.22)^x$ gives a company's predicted annual revenue, in dollars, x years after the company started selling jewelry online, where $0 < x \leq 10$. What is the best interpretation of the statement "$f(5)$ is approximately equal to $648{,}650$" in this context?

A. 5 years after the company started selling jewelry online, its predicted annual revenue is approximately $648{,}650$ dollars.

B. 5 years after the company started selling jewelry online, its predicted annual revenue will have increased by a total of approximately $648{,}650$ dollars.

C. When the company's predicted annual revenue is approximately $648{,}650$ dollars, it is 5 times the predicted annual revenue for the previous year.

D. When the company's predicted annual revenue is approximately $648{,}650$ dollars, it is 5% greater than the predicted annual revenue for the previous year.

ID: fb559c97 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the function f gives a company's predicted annual revenue, in dollars, x years after the company started selling jewelry online. Since the value of $f(5)$ is the value of $f(x)$ when $x = 5$, it follows that "$f(5)$ is approximately equal to $648{,}650$" means that $f(x)$ is approximately equal to $648{,}650$ when $x = 5$. Therefore, the best interpretation of the given statement is that 5 years after the company started selling jewelry online, its predicted annual revenue is approximately $648{,}650$ dollars.

Choice B is incorrect. The function f gives the predicted annual revenue, not the predicted increase in annual revenue.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect. In the given function, x represents the number of years after the company started selling jewelry online, not the percent increase in revenue from the previous year.

Question Difficulty: Easy

Question ID cbfcd000

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

ID: cbfcd000

The y-intercept of the graph of $y = x^2 + 31$ in the *xy*-plane is $(0, y)$. What is the value of y?

ID: cbfcd000 Answer

Correct Answer: 31

Rationale

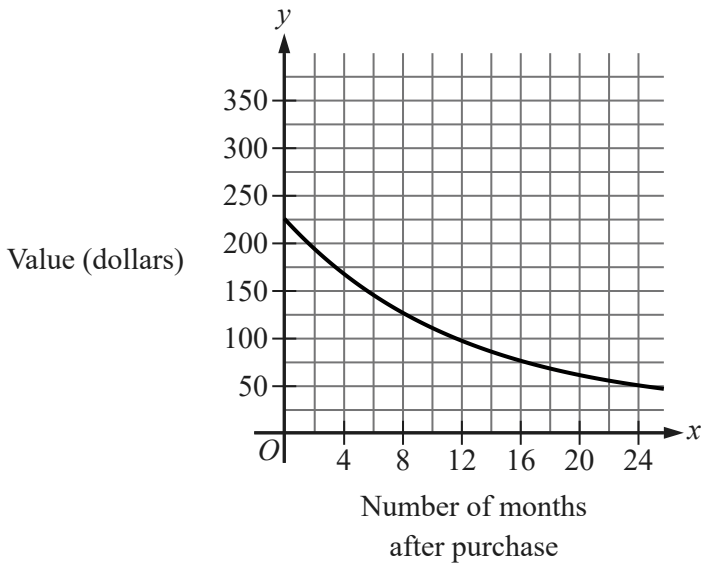
The correct answer is 31. It's given that the *y*-intercept of the graph of $y = x^2 + 31$ in the *xy*-plane is $(0, y)$. Substituting 0 for x in the given equation yields $y = (0)^2 + 31$, or $y = 31$. Thus, the value of y is 31.

Question Difficulty: Easy

Question ID 74e3e032

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

ID: 74e3e032



The graph shown gives the estimated value, in dollars, of a tablet as a function of the number of months since it was purchased. What is the best interpretation of the *y*-intercept of the graph in this context?

A. The estimated value of the tablet was $\$225$ when it was purchased.

B. The estimated value of the tablet 24 months after it was purchased was $\$225$.

C. The estimated value of the tablet had decreased by $\$225$ in the 24 months after it was purchased.

D. The estimated value of the tablet decreased by approximately 2.25% each year after it was purchased.

ID: 74e3e032 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the graph shown gives the estimated value y, in dollars, of a tablet as a function of the number of months since it was purchased, x. The *y*-intercept of a graph is the point at which the graph intersects the *y*-axis, or when x is 0. The graph shown intersects the *y*-axis at the point $(0, 225)$. It follows that 0 months after the tablet was purchased, or when the tablet was purchased, the estimated value of the tablet was 225 dollars. Therefore, the best interpretation of the *y*-intercept is that the estimated value of the tablet was $\$225$ when it was purchased.

Choice B is incorrect. The estimated value of the tablet 24 months after it was purchased was $\$50$, not $\$225$.

Choice C is incorrect. The estimated value of the tablet had decreased by $\$225 - \$50$, or $\$175$, not $\$225$, in the 24 months after it was purchased.

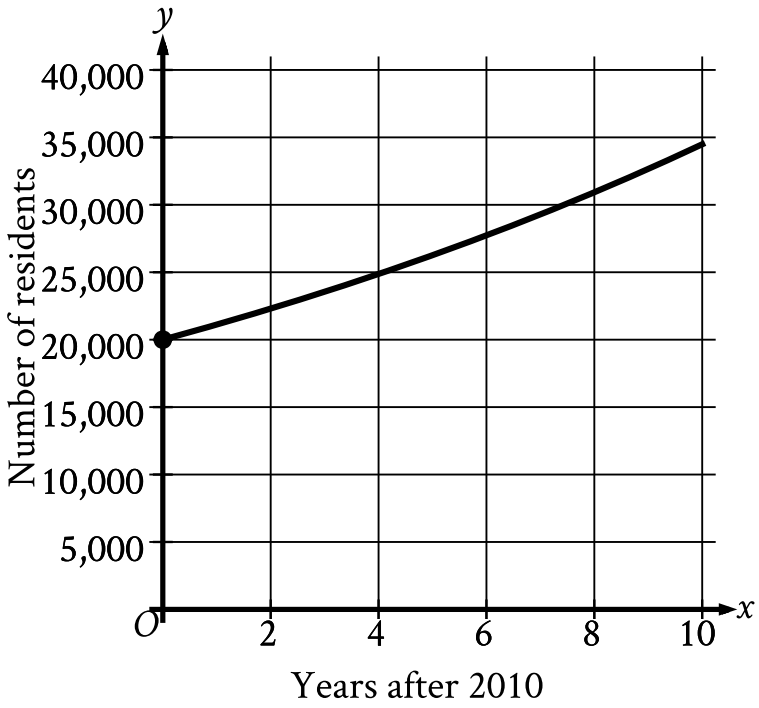
Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 0ad45980

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

ID: 0ad45980



The graph shown models the number of residents of a certain city x years after 2010. How many residents does this model estimate the city had in 2010?

A. 0

B. $2{,}000$

C. $20{,}000$

D. $25{,}000$

ID: 0ad45980 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that x represents years after 2010. Therefore, 2010 is represented by $x = 0$. On the model shown, the point with an x-coordinate of 0 has a y-coordinate of $20{,}000$. Thus, the model estimates that in 2010, the city had $20{,}000$ residents.

Choice A is incorrect. This is the value of x that represents the year 2010.

Choice B is incorrect and may result from conceptual or calculation errors.

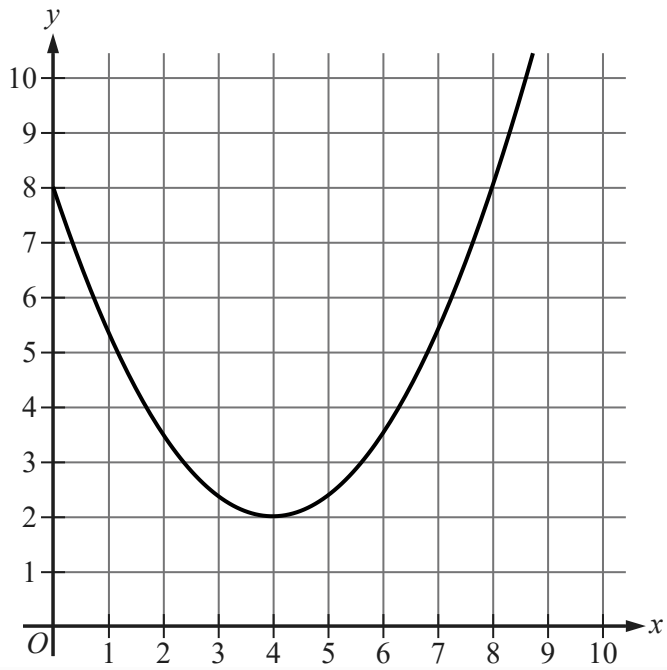
Choice D is incorrect. This is approximately the number of residents the model estimates the city had in 2014, not 2010.

Question Difficulty: Easy

Question ID d6b10177

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

ID: d6b10177



The graph shows a marble's height above the ground y, in inches, x seconds after it started moving on an elevated track of a marble run. Which of the following is the best interpretation of the y-intercept of the graph?

A. The marble's height was 0 inches above the ground 8 seconds after it started moving.

B. The marble's height was 8 inches above the ground when it started moving.

C. The marble's minimum height was 0 inches above the ground.

D. The marble's minimum height was 8 inches above the ground.

ID: d6b10177 Answer

Correct Answer: B

Rationale

Choice B is correct. The *y*-intercept of a graph is the point at which the graph intersects the *y*-axis. The graph shown intersects the *y*-axis at the point $(0, 8)$. Therefore, the *y*-intercept of the graph is $(0, 8)$. It's given that y is the height of the marble above the ground, in inches, and x is the number of seconds after the marble started moving. It follows that the marble's height was 8 inches above the ground 0 seconds after it started moving. Therefore, the best interpretation of the *y*-intercept of the graph is that the marble's height was 8 inches above the ground when it started moving.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID f8a41cc8

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

ID: f8a41cc8

At the time of posting a video, a social media channel had 53 subscribers. Each day for five days after the video was posted, the number of subscribers doubled from the number the previous day. Which equation gives the total number of subscribers, n, to the channel d days after the video was posted?

A. $n =$ msup

B. $n = 53(2)^{d}$

C. $n = 53$msup

D. $n =$ msup $+ d$

ID: f8a41cc8 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that each day for five days after a social media channel posted a video, the number of subscribers doubled from the number the previous day. Since the number of subscribers doubled each day, the relationship between n and d can be represented by an exponential equation of the form $n = ab^{d}$, where a is the number of subscribers at the time of posting the video and the number of subscribers to the channel increases by a factor of b each day. It's given that at the time of posting the video, the channel had 53 subscribers. Therefore, $a = 53$. It's also given that the number of subscribers doubled, or increased by a factor of 2, from the number the previous day. Therefore, $b = 2$. Substituting 53 for a and 2 for b in the equation $n = ab^{d}$ yields $n = 53(2)^{d}$.

Choice A is incorrect. This equation gives the total number of subscribers to a channel for which the initial number of subscribers was 1 and the number increased each day by 53 times the number from the previous day.

Choice C is incorrect. This equation gives the total number of subscribers to a channel for which the number of subscribers each day was half the number from the previous day, rather than double the number.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 5ba6bd07

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

ID: 5ba6bd07

$$h(x) = x^2 - 3$$

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

A.

x	1	2	3
$h(x)$	4	5	6

B.

x	1	2	3
$h(x)$	-2	1	6

C.

x	1	2	3
$h(x)$	-1	1	3

D.

x	1	2	3
$h(x)$	-2	1	3

ID: 5ba6bd07 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that $h(x) = x^2 - 3$. Each table gives 1, 2, and 3 as the three given values of x. Substituting 1 for x in the equation $h(x) = x^2 - 3$ yields $h(1) = (1)^2 - 3$, or $h(1) = -2$. Substituting 2 for x in the equation $h(x) = x^2 - 3$ yields $h(2) = (2)^2 - 3$, or $h(2) = 1$. Finally, substituting 3 for x in the equation $h(x) = x^2 - 3$ yields $h(3) = (3)^2 - 3$, or $h(3) = 6$. Therefore, $h(x)$ is -2 when x is 1, $h(x)$ is 1 when x is 2, and $h(x)$ is 6 when x is 3. Choice B is a table with these values of x and their corresponding values of $h(x)$.

Choice A is incorrect. This is a table of values for the function $h(x) = x + 3$, not $h(x) = x^2 - 3$.

Choice C is incorrect. This is a table of values for the function $h(x) = 2x - 3$, not $h(x) = x^2 - 3$.

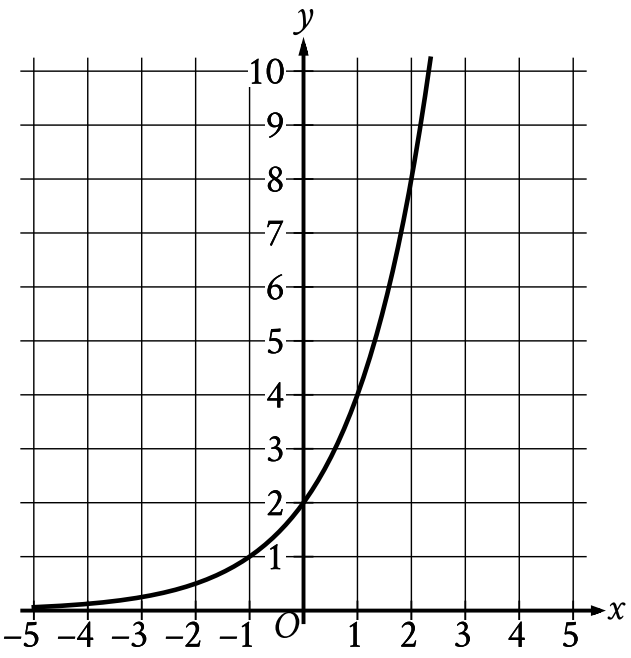
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID 4f5ff634

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

ID: 4f5ff634



What is the *y*-intercept of the graph shown?

A. $(0, 0)$

B. $(0, 2)$

C. $(2, 0)$

D. $(2, 2)$

ID: 4f5ff634 Answer

Correct Answer: B

Rationale

Choice B is correct. The *y*-intercept of a graph in the *xy*-plane is the point at which the graph crosses the *y*-axis. The graph shown crosses the *y*-axis at the point $(0, 2)$. Therefore, the *y*-intercept of the graph shown is $(0, 2)$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

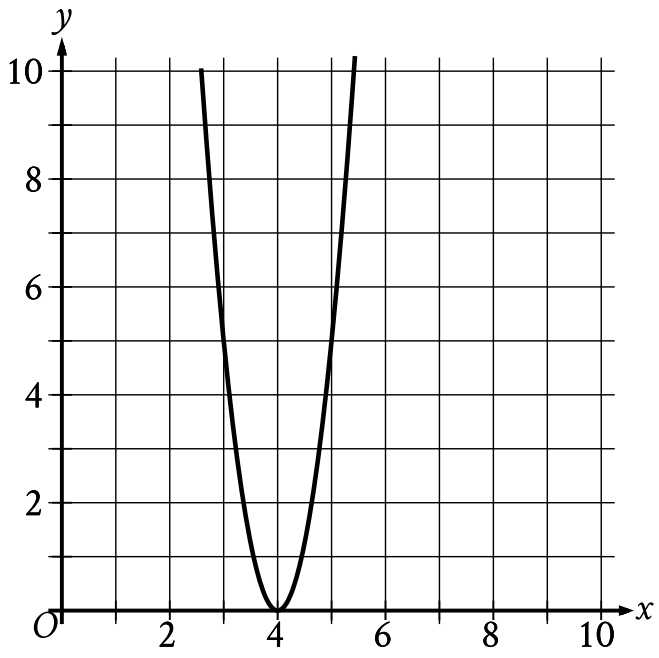
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID f4006172

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

ID: f4006172



What is the *x*-intercept of the graph shown?

A. $(-5, 0)$

B. $(5, 0)$

C. $(-4, 0)$

D. $(4, 0)$

ID: f4006172 Answer

Correct Answer: D

Rationale

Choice D is correct. The *x*-intercept of the graph shown is the point (x, y) on the graph where $y = 0$. At $y = 0$, the corresponding value of x is 4. Therefore, the *x*-intercept of the graph shown is $(4, 0)$.

Choice A is incorrect. This is the *x*-intercept of a graph in the *xy*-plane that intersects the *x*-axis at $x = -5$, not $x = 4$.

Choice B is incorrect. This is the *x*-intercept of a graph in the *xy*-plane that intersects the *x*-axis at $x = 5$, not $x = 4$.

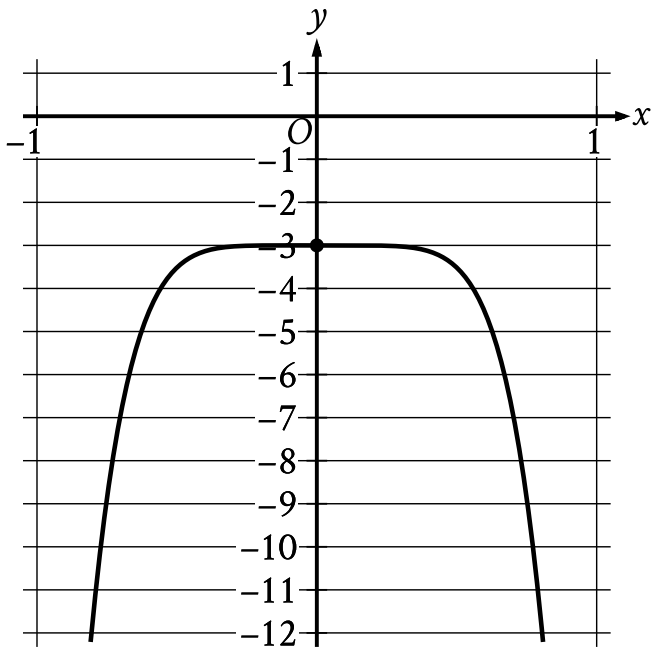
Choice C is incorrect. This is the *x*-intercept of a graph in the *xy*-plane that intersects the *x*-axis at $x = -4$, not $x = 4$.

Question Difficulty: Easy

Question ID 089483cd

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

ID: 089483cd



The graph of the polynomial function f, where $y = f(x)$, is shown. The *y*-intercept of the graph is $(0, y)$. What is the value of y?

ID: 089483cd Answer

Correct Answer: -3

Rationale

The correct answer is -3. The *y*-intercept of the graph of a function in the *xy*-plane is the point where the graph crosses the *y*-axis. The graph of the polynomial function shown crosses the *y*-axis at the point $(0, -3)$. It's given that the *y*-intercept of the graph is $(0, y)$. Thus, the value of y is -3.

Question Difficulty: Easy

Question ID a4ac7f91

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

ID: a4ac7f91

The function f is defined by $f(x) = 8\sqrt{x}$. For what value of x does $f(x) = 48$?

A. 6

B. 8

C. 36

D. 64

ID: a4ac7f91 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that $f(x) = 8\sqrt{x}$. Substituting 48 for $f(x)$ in this equation yields $48 = 8\sqrt{x}$. Dividing both sides of this equation by 8 yields $6 = \sqrt{x}$. This can be rewritten as $\sqrt{x} = 6$. Squaring both sides of this equation yields $x = 36$. Therefore, the value of x for which $f(x) = 48$ is 36.

Choice A is incorrect. If $x = 6$, $f(x) = 8\sqrt{6}$, not 48.

Choice B is incorrect. If $x = 8$, $f(x) = 8\sqrt{8}$, not 48.

Choice D is incorrect. If $x = 64$, $f(x) = 8\sqrt{64}$, which is equivalent to 64, not 48.

Question Difficulty: Easy

Question ID b5b477cb

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

ID: b5b477cb

An investment account was opened with an initial value of $\$890$. The value of the account doubled every 10 years. Which equation represents the value of the account $M(t)$, in dollars, t years after the account was opened?

A. $M(t) = 890\left(\frac{1}{2}\right)^{\frac{t}{10}}$

B. $M(t) = 890\left(\frac{1}{10}\right)^{\frac{t}{2}}$

C. $M(t) = 890(2)^{\frac{t}{10}}$

D. $M(t) = 890(10)^{\frac{t}{2}}$

ID: b5b477cb Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that t represents the number of years since the account was opened. Therefore, $\frac{t}{10}$ represents the number of 10-year periods since the account was opened. Since the value of the account doubles during each of these 10-year periods, the value of the account can be found by multiplying the initial value by $\frac{t}{10}$ factors of 2. This is equivalent to $2^{\frac{t}{10}}$. It's given that the initial value of the account is $\$890$. Therefore, the value of the account $M(t)$, in dollars, t years after the account was opened can be represented by $M(t) = 890(2)^{\frac{t}{10}}$.

Choice A is incorrect. This equation represents the value of an account if the value of the account halves, not doubles, every 10 years.

Choice B is incorrect. This equation represents the value of an account if the value of the account decreases by 90%, not doubles, every 2, not 10, years.

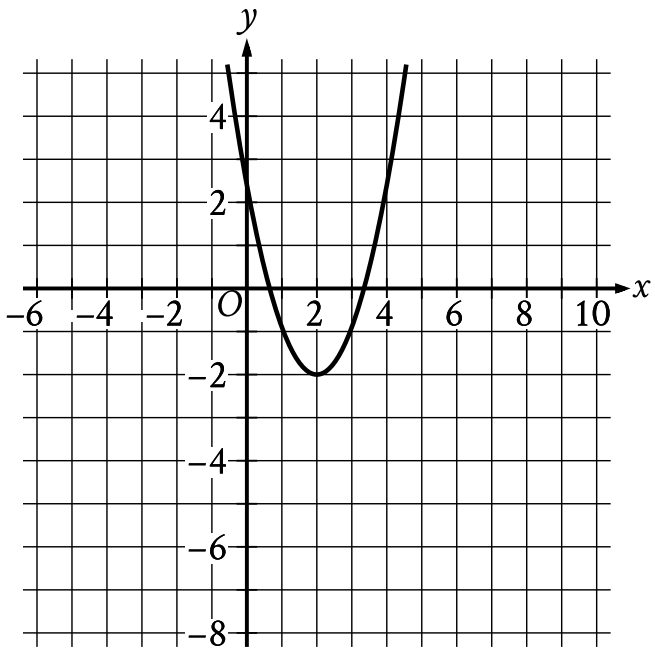
Choice D is incorrect. This equation represents the value of an account if the value of the account increases by a factor of 10, not doubles, every 2, not 10, years.

Question Difficulty: Easy

Question ID f163697b

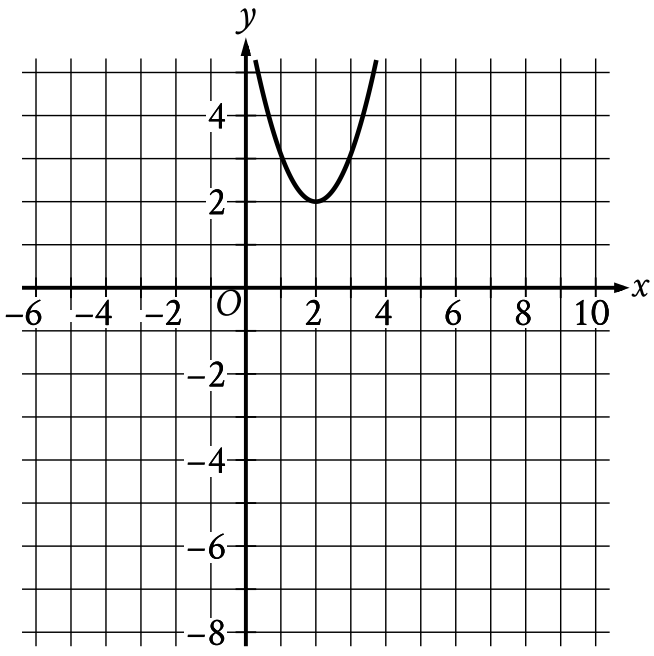
Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear functions	Easy

ID: f163697b

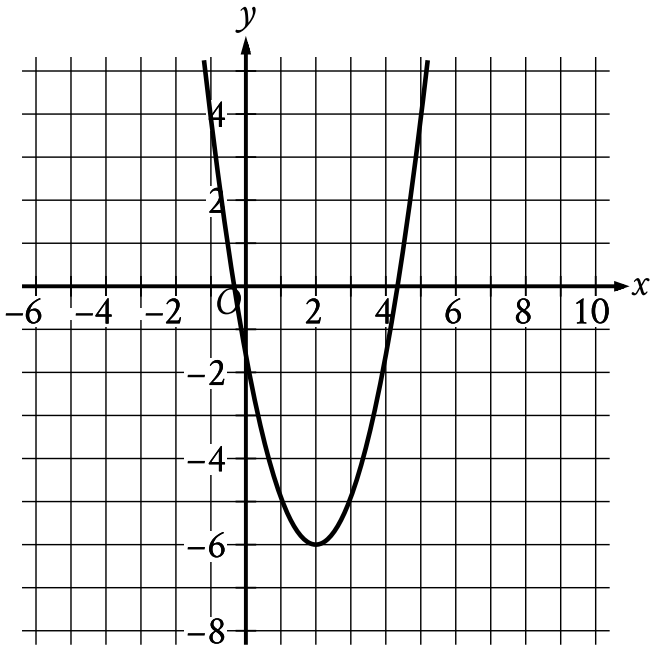


The graph shown will be translated up 4 units. Which of the following will be the resulting graph?

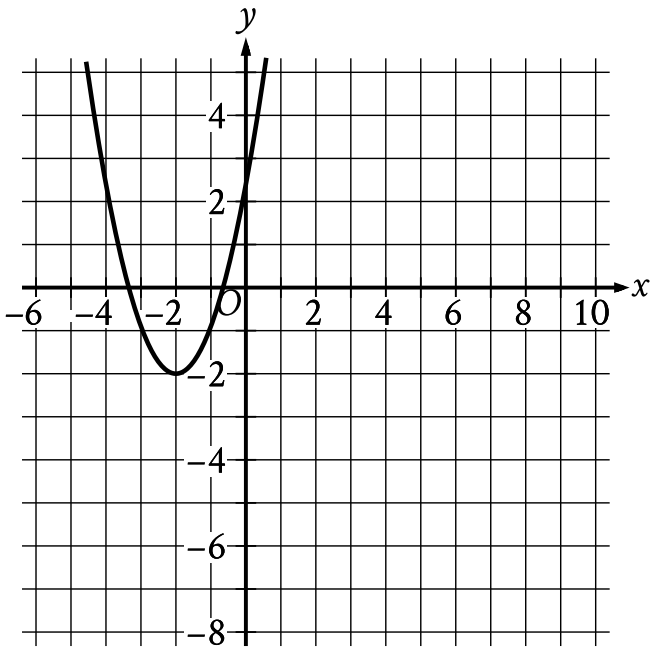
A.



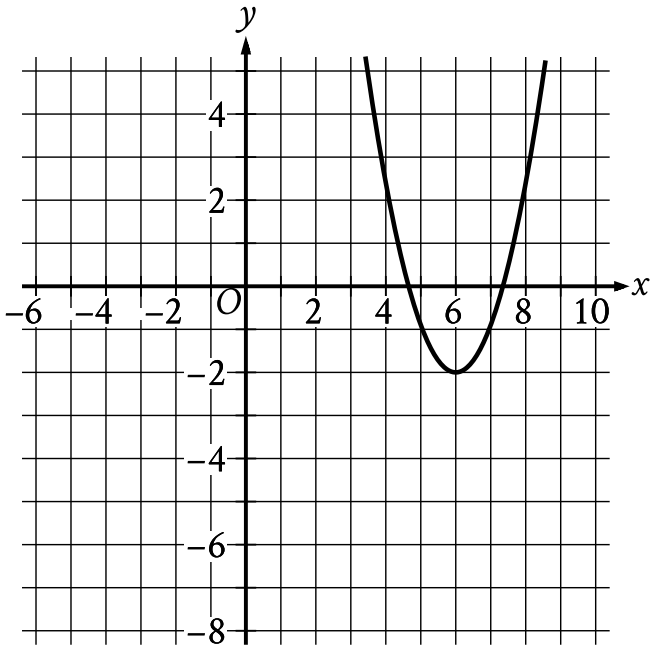
B.



C.



D.



ID: f163697b Answer

Correct Answer: A

Rationale

Choice A is correct. When a graph is translated up 4 units, each point on the resulting graph is 4 units above the point on the original graph. In other words, the *y*-value of each point on the graph increases by 4. The graph shown passes through the points $(1, -1)$, $(2, -2)$, and $(3, -1)$. It follows that when the graph shown is translated up 4 units, the resulting graph will pass through the points $(1, -1 + 4)$, $(2, -2 + 4)$, and $(3, -1 + 4)$. These points are $(1, 3)$, $(2, 2)$, and $(3, 3)$, respectively. Of the given choices, only the graph in choice A passes through the points $(1, 3)$, $(2, 2)$, and $(3, 3)$.

Choice B is incorrect. This is the result of translating the graph down, rather than up, 4 units.

Choice C is incorrect. This is the result of translating the graph left, rather than up, 4 units.

Choice D is incorrect. This is the result of translating the graph right, rather than up, 4 units.

Question Difficulty: Easy

Question ID e577d895

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

ID: e577d895

The function $f(x) = 200{,}000(1.21)^x$ gives a company's predicted annual revenue, in dollars, x years after the company started selling light bulbs online, where $0 < x \leq 10$. What is the best interpretation of the statement "$f(5)$ is approximately equal to $518{,}748$" in this context?

A. 5 years after the company started selling light bulbs online, its predicted annual revenue is approximately $518{,}748$ dollars.

B. 5 years after the company started selling light bulbs online, its predicted annual revenue will have increased by a total of approximately $518{,}748$ dollars.

C. When the company's predicted annual revenue is approximately $518{,}748$ dollars, it is 5 times the predicted annual revenue for the previous year.

D. When the company's predicted annual revenue is approximately $518{,}748$ dollars, it is 5% greater than the predicted annual revenue for the previous year.

ID: e577d895 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the function $f(x) = 200{,}000(1.21)^x$ gives a company's predicted annual revenue, in dollars, x years after the company started selling light bulbs online. It follows that $f(x)$ represents the company's predicted annual revenue, in dollars, x years after the company started selling light bulbs online. Since the value of $f(5)$ is the value of $f(x)$ when $x = 5$, it follows that "$f(5)$ is approximately equal to $518{,}748$" means that $f(x)$ is approximately equal to $518{,}748$ when $x = 5$. Therefore, the best interpretation of the statement "$f(5)$ is approximately equal to $518{,}748$" in this context is 5 years after the company started selling light bulbs online, its predicted annual revenue is approximately $518{,}748$ dollars.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

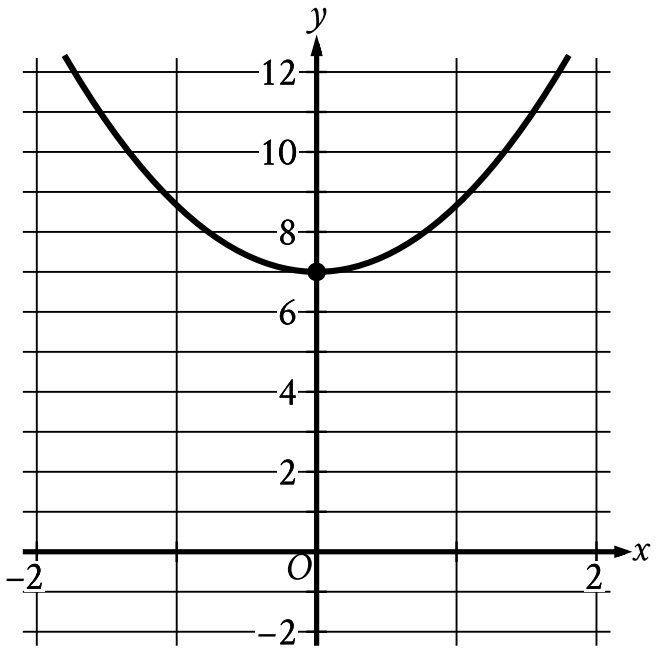
Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID df0ef976

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

ID: df0ef976



The parabola shown intersects the *y*-axis at the point (x, y). What is the value of y?

ID: df0ef976 Answer

Correct Answer: 7

Rationale

The correct answer is 7. It's given that the parabola intersects the *y*-axis at the point (x, y). The graph shows that the parabola intersects the *y*-axis at the point $(0, 7)$. Therefore, the value of y is 7.

Question Difficulty: Easy