

Question ID b2aee94a

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: b2aee94a

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: b2aee94a Answer

Correct Answer: D

Rationale

Choice D is correct. The value of $g4$ is the value of gx when $x = 4$. Substituting 4 for x in the given equation yields $g4 = 4 + 18$, which is equivalent to $g4 = 22$, or $g4 = 22$. Therefore, the value of $g4$ is 22.

Choice A is incorrect. This would be the value of $g4$ if function g was defined by $gx = - 18$, not $gx = x + 18$.

Choice B is incorrect. This would be the value of $g4$ if function g was defined by $gx = - x$, not $gx = x + 18$.

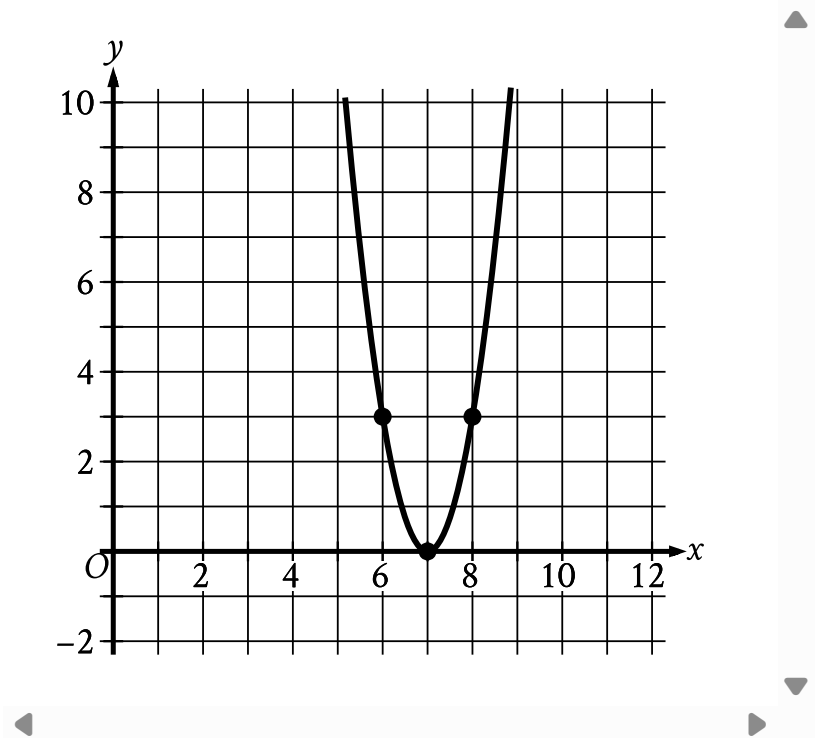
Choice C is incorrect. This would be the value of $g4$ if function g was defined by $gx = -x + 18$, not $gx = x + 18$.

Question Difficulty: Easy

Question ID 6217cb62

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 6217cb62



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

ID: 6217cb62 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 a3e4550c

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: a3e4550c

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: a3e4550c Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that $fx = \frac{1}{6x}$. Substituting 3 for x in this equation yields $f3 = \frac{1}{63}$, or $f3 = \frac{1}{18}$. Therefore, when $x = 3$, the value of fx is $\frac{1}{18}$.

Choice A is incorrect. This is the value of fx when $x = 0.5$.

Choice B is incorrect. This is the value of fx when $x = 1$.

Choice C is incorrect. This is the value of fx when $x = 1.5$.

Question Difficulty: Easy

Question ID 6f2658d4

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 6f2658d4

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: 6f2658d4 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 cb2f4a8a

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: cb2f4a8a

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: cb2f4a8a Answer

Correct Answer: B

Rationale

Choice B is correct. The value of $f144$ 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 $f144 = 4 + \sqrt{144}$. Since the positive square root of 144 is 12, it follows that this equation can be rewritten as $f144 = 4 + 12$, or $f144 = 16$. Therefore, the value of $f144$ is 16.

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

Choice C is incorrect. This is the value of $f1,296$, not $f144$.

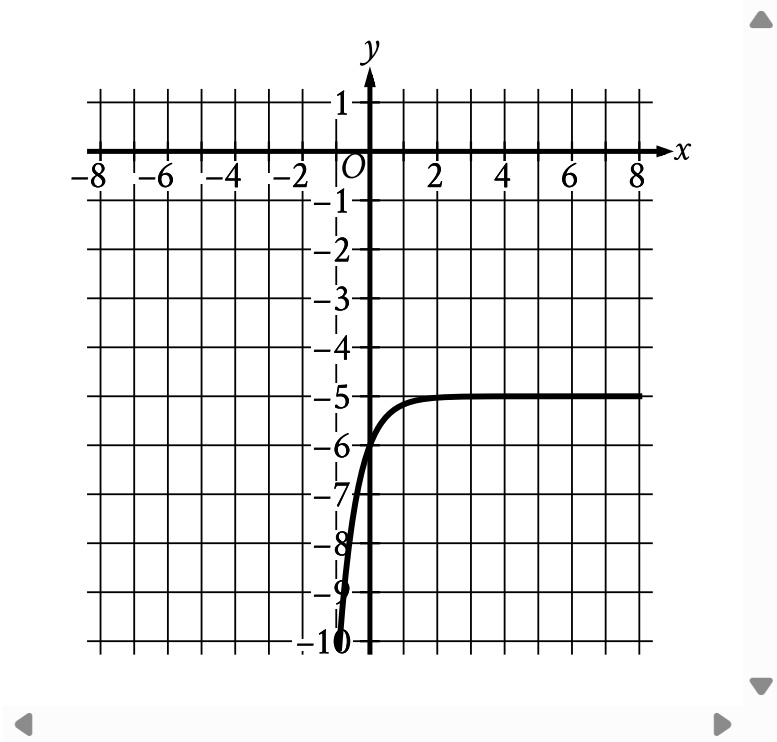
Choice D is incorrect. This is the value of $f5,184$, not $f144$.

Question Difficulty: Easy

Question ID 1b1b1cbf

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 1b1b1cbf



What is the y-intercept of the graph shown?

- A. $(0, -6)$
- B. $(-6, 0)$
- C. $(0, 0)$
- D. $(-5, -5)$

ID: 1b1b1cbf 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.

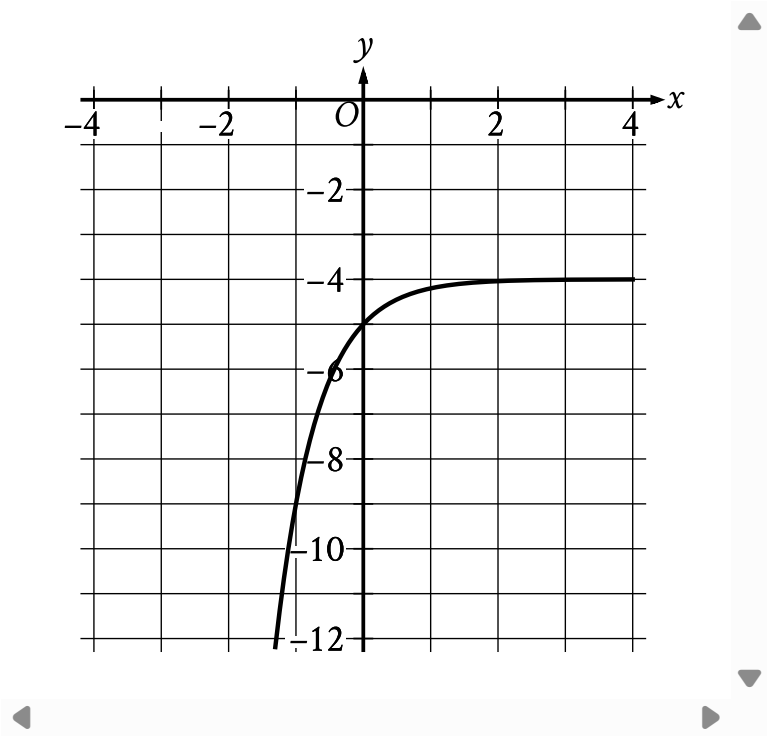
Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 606edc58

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 606edc58



What is the y -intercept of the graph shown?

- A. $(-1, -9)$
- B. $(0, -5)$
- C. $(0, -4)$
- D. $(0, 0)$

ID: 606edc58 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 34cf94ec

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 34cf94ec

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: 34cf94ec 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 $2 \cdot 3 + 9$, not $2^3 + 9$.

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

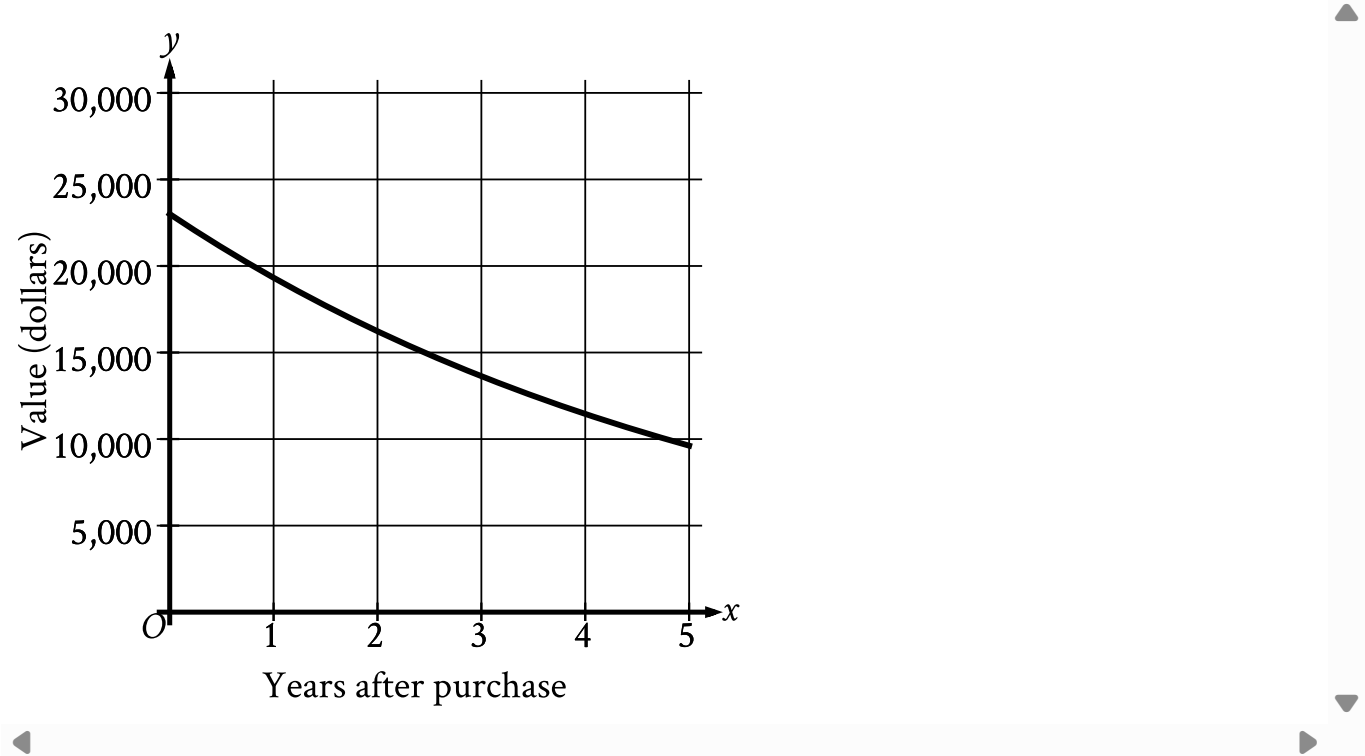
Question Difficulty: Easy

Question ID be579e5f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: be579e5f

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: be579e5f 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.

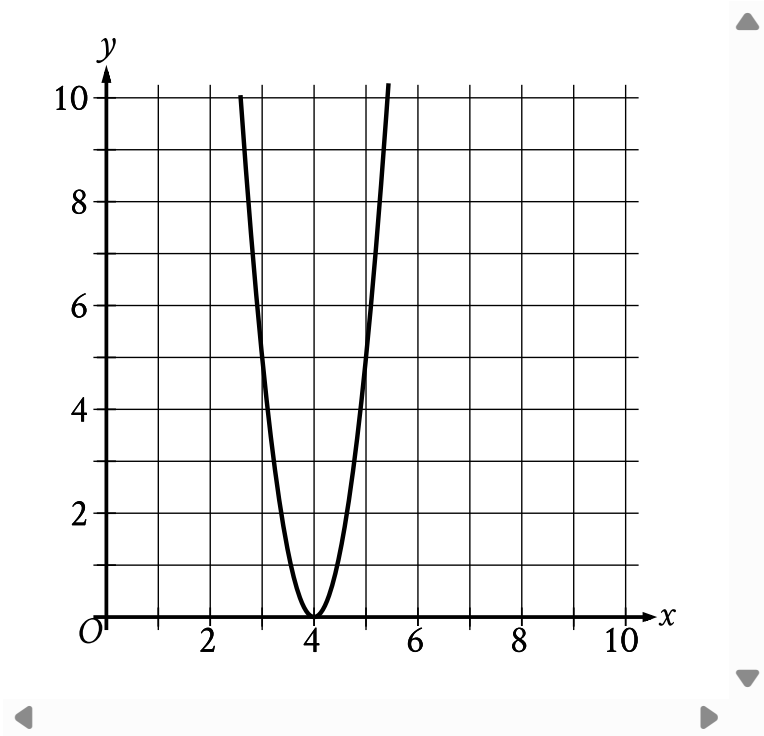
Choice D is incorrect. This is closest to the predicted value of the sport utility vehicle when it is first purchased.

Question Difficulty: Easy

Question ID 53730316

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 53730316



What is the x -intercept of the graph shown?

- A. $(-5, 0)$
- B. $(5, 0)$
- C. $(-4, 0)$
- D. $(4, 0)$

ID: 53730316 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 $x = 4$.

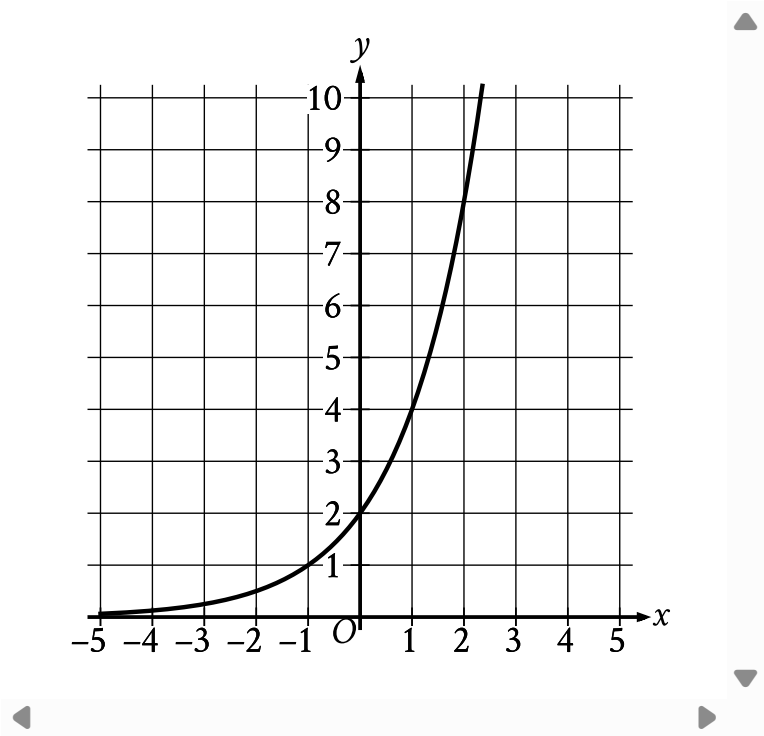
Choice C is incorrect. This is the x -intercept of a graph in the xy -plane that intersects the x -axis at $x = -4$, not $x = 4$.

Question Difficulty: Easy

Question ID f92896a6

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: f92896a6



What is the y-intercept of the graph shown?

- A. (0, 0)
- B. (0, 2)
- C. (2, 0)
- D. (2, 2)

ID: f92896a6 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 288c81be

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 288c81be

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: 288c81be Answer

Correct Answer: C

Rationale

Choice C is correct. The value of $f2$ is the value of f_x when $x = 2$. Substituting 2 for x in the given function yields $f2 = 2^3 + 15$, or $f2 = 8 + 15$, which is equivalent to $f2 = 23$. Therefore, the value of $f2$ is 23.

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

Choice B is incorrect. This is the value of $f2$ when $f_x = x3 + 15$, rather than $f_x = x^3 + 15$.

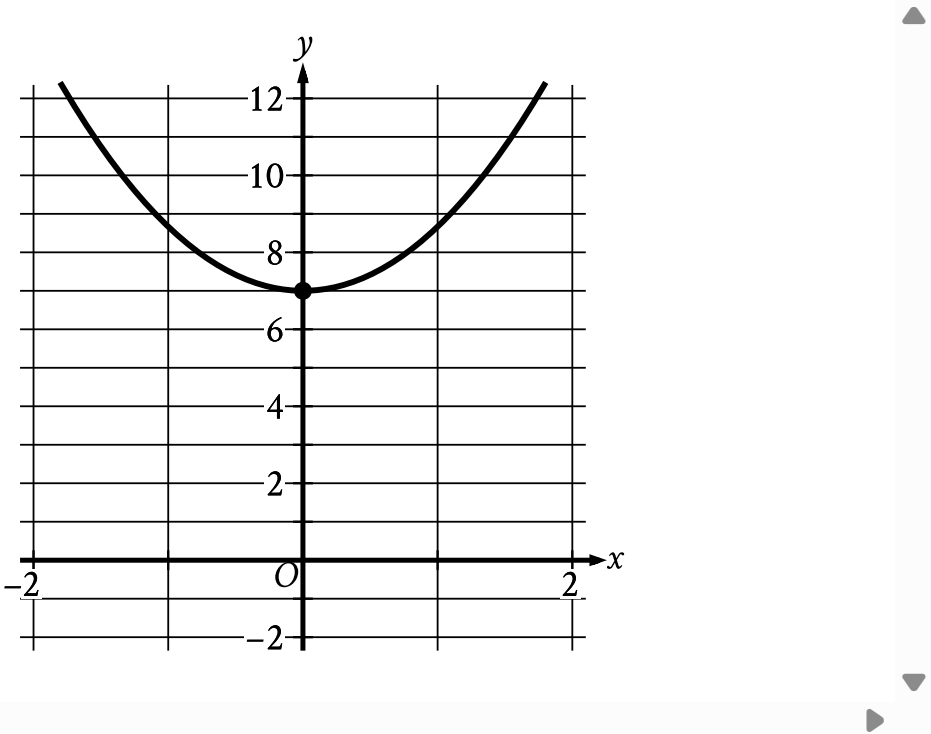
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID 3cc0acf5

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 3cc0acf5



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

ID: 3cc0acf5 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

Question ID 11066939

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 11066939

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: 11066939 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the function f is defined by $fx = 5x^2$. Substituting 8 for x in $fx = 5x^2$ yields $f8 = 58^2$, which is equivalent to $f8 = 564$, or $f8 = 320$. Therefore, the value of $f8$ is 320.

Choice A is incorrect. This is the value of $f8$ if $fx = 5x$.

Choice B is incorrect. This is the value of $f8$ if $fx = 5x + 2$.

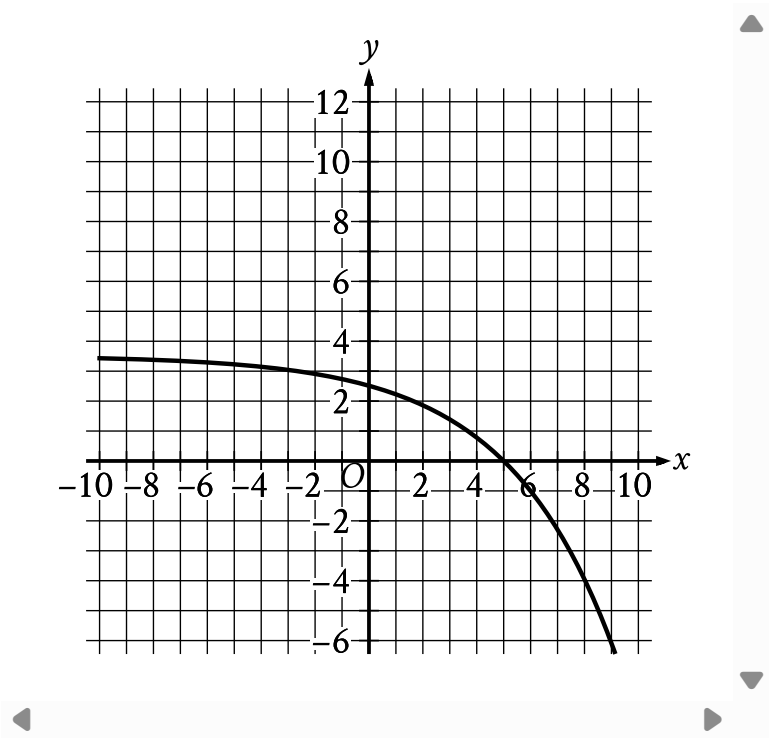
Choice C is incorrect. This is the value of $f8$ if $fx = 5x2$.

Question Difficulty: Easy

Question ID 77b35575

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 77b35575



What is the x-intercept of the graph shown?

- A. $(-5, 0)$
- B. $(5, 0)$
- C. $(-2, 0)$
- D. $(2, 0)$

ID: 77b35575 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.

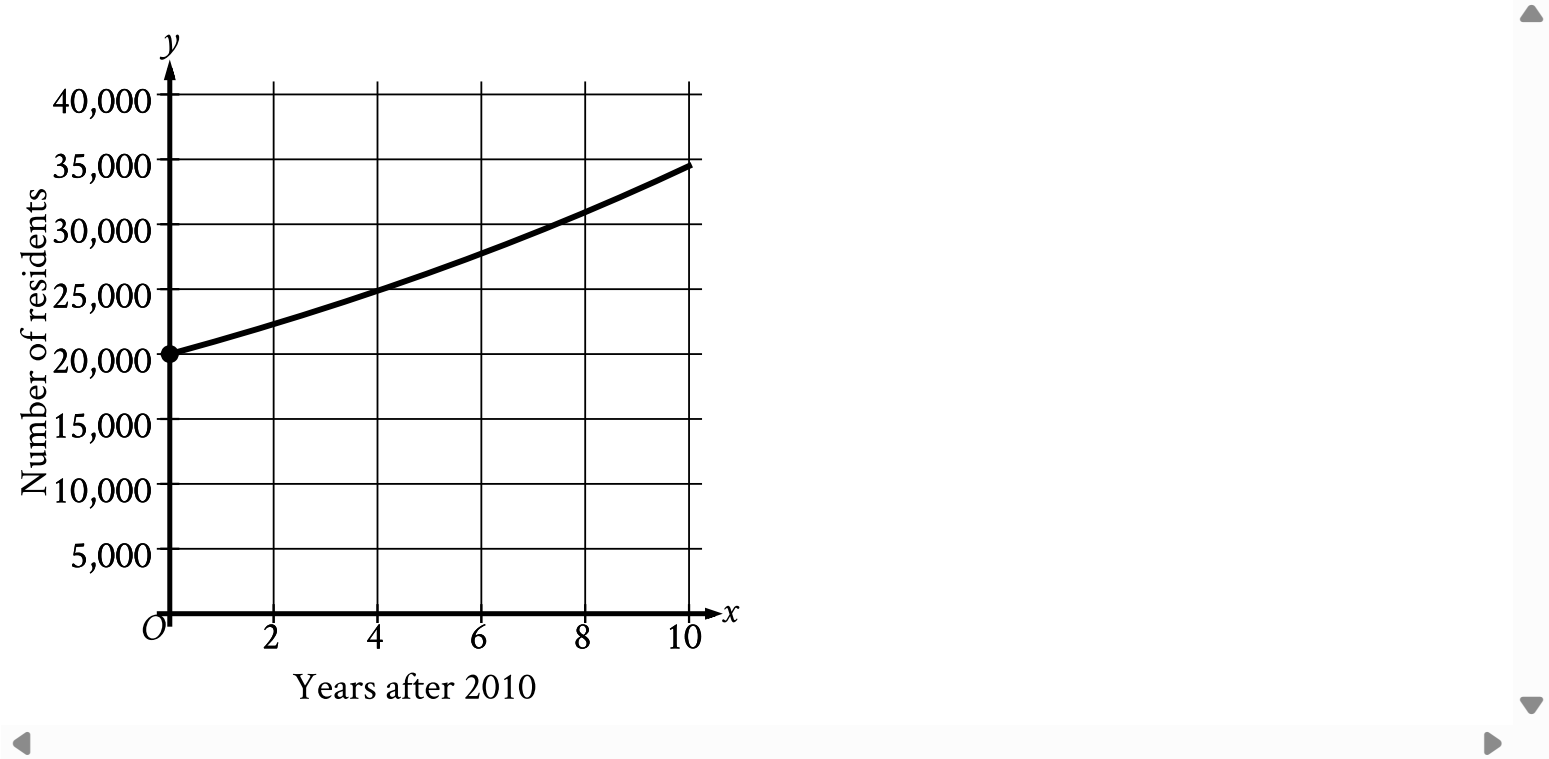
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID ecf4620a

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: ecf4620a



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: ecf4620a 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 ID 3189516f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 3189516f

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: 3189516f Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that $gx = x^2 + 9$. Substituting 25 for gx 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 $gx = 25$ 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.

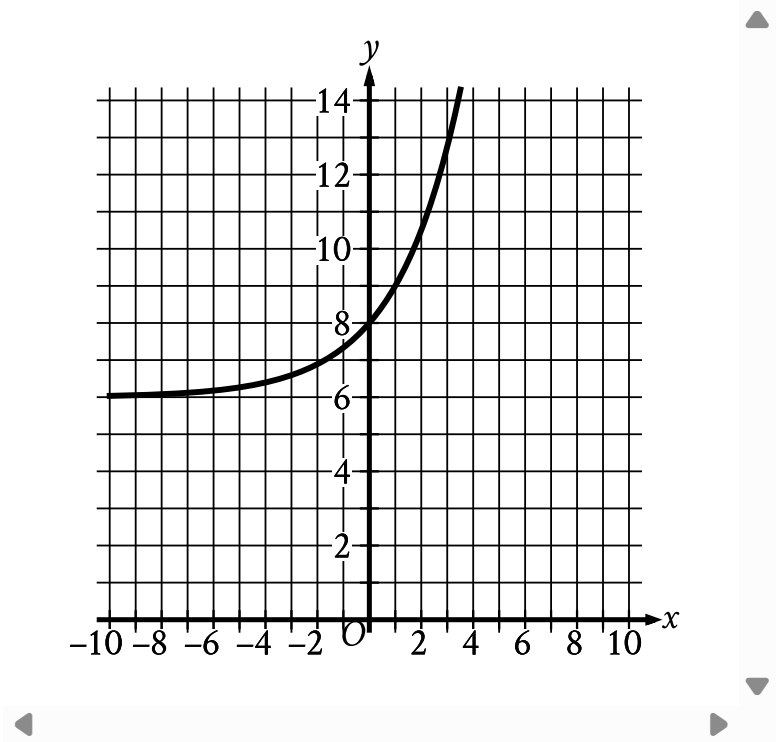
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID a2166248

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: a2166248



What is the y-intercept of the graph shown?

- A. $(-8, 0)$
- B. $(-6, 0)$
- C. $(0, 6)$
- D. $(0, 8)$

ID: a2166248 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.

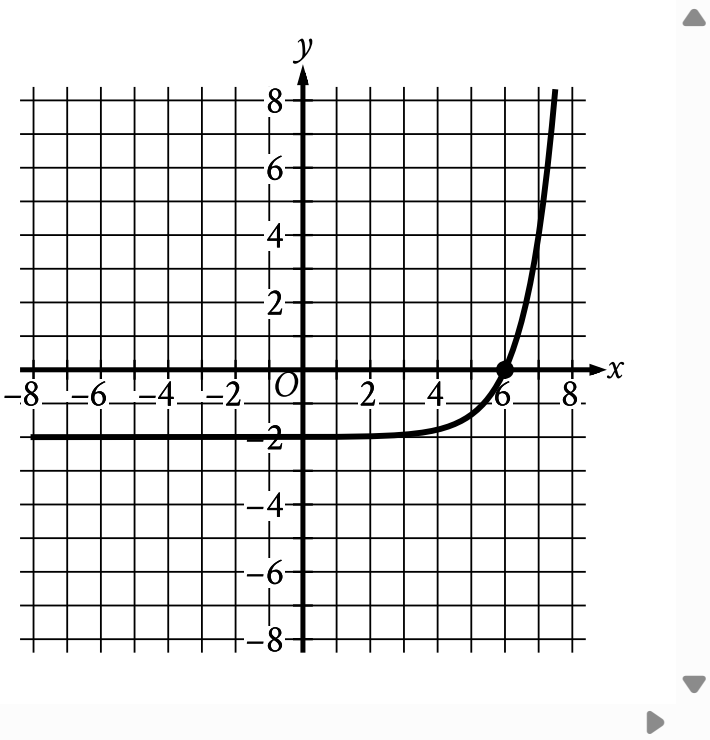
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

Question ID 5b574c25

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 5b574c25



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

ID: 5b574c25 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 9888ca87

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 9888ca87

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: 9888ca87 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that $fx = \frac{16}{x}$. Substituting 17 for x in this function yields $f17 = \frac{16}{17}$. Therefore, when $x = 17$, the value of fx is $\frac{16}{17}$.

Choice B is incorrect. This is the value of the reciprocal of fx when $x = 17$.

Choice C is incorrect. This is the value of fx when $x = 1$.

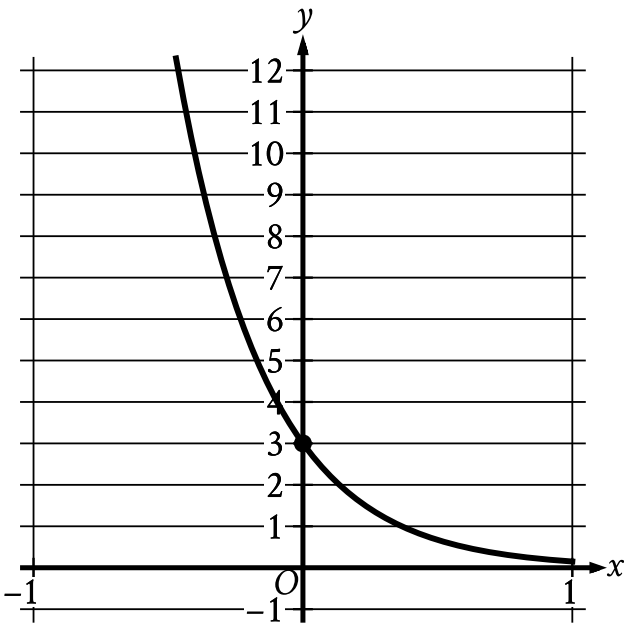
Choice D is incorrect. This is the value of x when $x = 17$.

Question Difficulty: Easy

Question ID 4a05c831

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 4a05c831



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: 4a05c831 Answer

Correct Answer: 3

Rationale

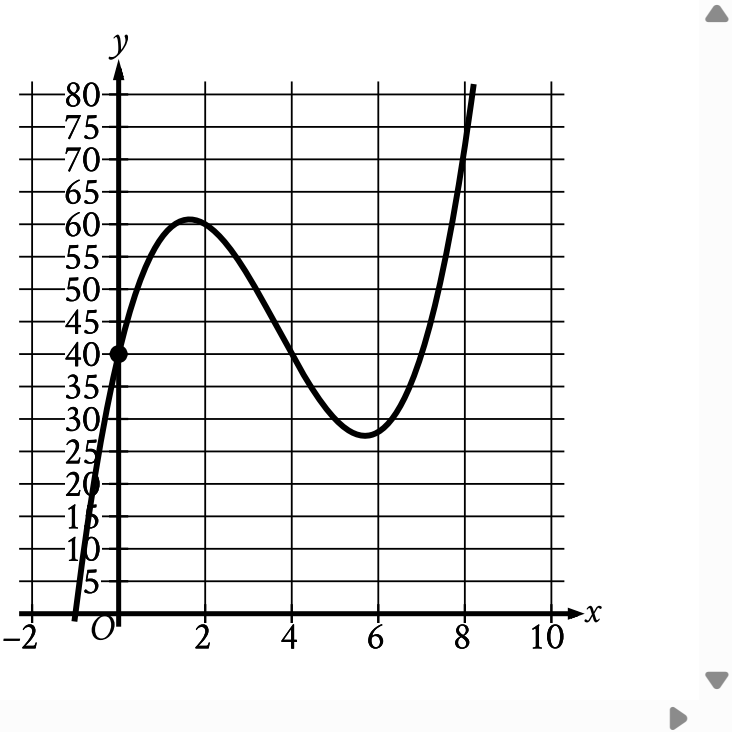
The correct answer is 3. It's given that the y -intercept of the graph shown is $0, y$. The graph passes through the point $0, 3$. Therefore, the value of y is 3.

Question Difficulty: Easy

Question ID 9cc38e5f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear functions	<div><div></div><div></div><div></div></div>

ID: 9cc38e5f



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

ID: 9cc38e5f 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