Question ID 92921647

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 92921647

For the function f, the graph of $y = f(x)$ in the *xy*-plane has a slope of 3 and passes through the point $(0, -8)$. Which equation defines f?

A. $f(x) = 3x$

B. $f(x) = 3x - 8$

C. $f(x) = 3x + 5$

D. $f(x) = 3x + 11$

ID: 92921647 Answer

Correct Answer: B

Rationale

Choice B is correct. An equation defining a linear function can be written in the form $f(x) = mx + b$, where m and b are constants, m is the slope of the graph of $y = f(x)$ in the *xy*-plane, and $(0, b)$ is the *y*-intercept of the graph. It's given that for the function f, the graph of $y = f(x)$ in the *xy*-plane has a slope of 3. Therefore, $m = 3$. It's also given that this graph passes through the point $(0, -8)$. Therefore, the *y*-intercept of the graph is $(0, -8)$, and it follows that $b = -8$. Substituting 3 for m and -8 for b in the equation $f(x) = mx + b$ yields $f(x) = 3x - 8$. Thus, the equation that defines f is $f(x) = 3x - 8$.

Choice A is incorrect. For this function, the graph of $y = f(x)$ in the *xy*-plane passes through the point $(0, 0)$, not $(0, -8)$.

Choice C is incorrect. For this function, the graph of $y = f(x)$ in the *xy*-plane passes through the point $(0, 5)$, not $(0, -8)$.

Choice D is incorrect. For this function, the graph of $y = f(x)$ in the *xy*-plane passes through the point $(0, 11)$, not $(0, -8)$.

Question Difficulty: Easy

Question ID e1f981b8

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: e1f981b8

The function g is defined by $g(x) = 6x$. For what value of x is $g(x) = 54$?

ID: e1f981b8 Answer

Correct Answer: 9

Rationale

The correct answer is 9. It's given that $g(x) = 6x$. Substituting 54 for $g(x)$ in the given function yields $54 = 6x$. Dividing both sides of this equation by 6 yields $x = 9$. Therefore, the value of x when $g(x) = 54$ is 9.

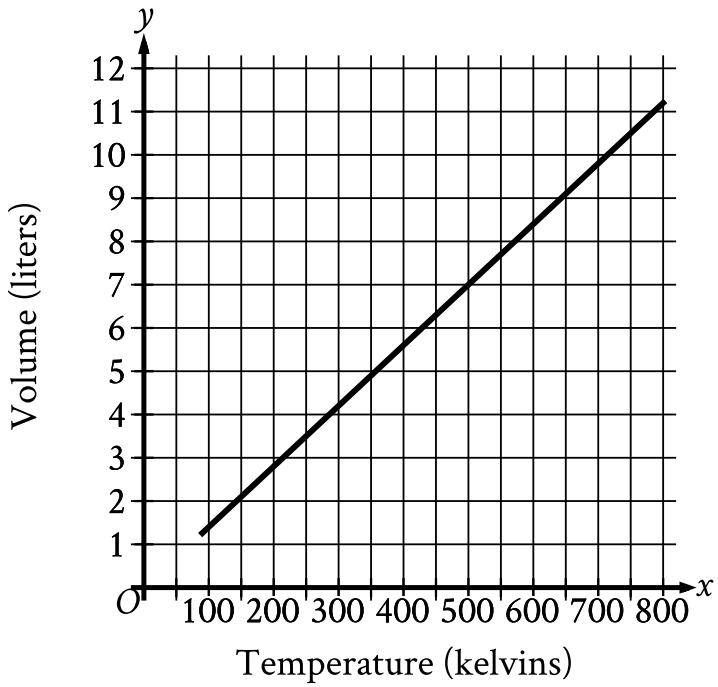
Question Difficulty: Easy

Question ID 3eef8a08

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 3eef8a08

Hydrogen is placed inside a container and kept at a constant pressure. The graph shows the estimated volume y, in liters, of the hydrogen when its temperature is x kelvins.



What is the estimated volume, in liters, of the hydrogen when its temperature is 500 kelvins?

A. 0

B. $\frac{7}{500}$

C. 7

D. $\frac{500}{7}$

ID: 3eef8a08 Answer

Correct Answer: C

Rationale

Choice C is correct. For the graph shown, the x-axis represents temperature, in kelvins, and the y-axis represents volume, in liters. Therefore, the estimated volume, in liters, of the hydrogen when its temperature is 500 kelvins is represented by the y-coordinate of the point on the graph that has an x-coordinate of 500. The point on the graph with an x-coordinate of 500 has a y-coordinate of 7. Therefore, the estimated volume, in liters, of the hydrogen when its temperature is 500 kelvins is 7.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 26e3a069

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 26e3a069

The function g is defined by $g(x) = 10x + 8$. What is the value of $g(x)$ when $x = 8$?

A. 0

B. 8

C. 10

D. 88

ID: 26e3a069 Answer

Correct Answer: D

Rationale

Choice D is correct. The value of $g(x)$ when $x = 8$ can be found by substituting 8 for x in the given equation $g(x) = 10x + 8$. This yields $g(8) = 10(8) + 8$, or $g(8) = 88$. Therefore, when $x = 8$, the value of $g(x)$ is 88.

Choice A is incorrect. This is the value of x when $g(x) = 8$, rather than the value of $g(x)$ when $x = 8$.

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 bc1e9b9b

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: bc1e9b9b

x	$f(x)$
0	29
1	32
2	35

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

A. $f(x) = 3x + 29$

B. $f(x) = 29x + 32$

C. $f(x) = 35x + 29$

D. $f(x) = 32x + 35$

ID: bc1e9b9b Answer

Correct Answer: A

Rationale

Choice A is correct. An equation that defines a linear function f can be written in the form $f(x) = mx + b$, where m and b are constants. It's given in the table that when $x = 0$, $f(x) = 29$. Substituting 0 for x and 29 for $f(x)$ in the equation $f(x) = mx + b$ yields $29 = m(0) + b$, or $29 = b$. Substituting 29 for b in the equation $f(x) = mx + b$ yields $f(x) = mx + 29$. It's also given in the table that when $x = 1$, $f(x) = 32$. Substituting 1 for x and 32 for $f(x)$ in the equation $f(x) = mx + 29$ yields $32 = m(1) + 29$, or $32 = m + 29$. Subtracting 29 from both sides of this equation yields $3 = m$. Substituting 3 for m in the equation $f(x) = mx + 29$ yields $f(x) = 3x + 29$.

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 389861fc

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 389861fc

The function h is defined by $h(x) = x + 200$. What is the value of $h(50)$?

A. 200

B. 250

C. $10{,}000$

D. $50{,}200$

ID: 389861fc Answer

Correct Answer: B

Rationale

Choice B is correct. Substituting 50 for x in the given function yields $h(50) = 50 + 200$, or $h(50) = 250$. Therefore, the value of $h(50)$ is 250.

Choice A is incorrect. This is the value of $h(0)$.

Choice C is incorrect. This is the value of $h(9{,}800)$.

Choice D is incorrect. This is the value of $h(50{,}000)$.

Question Difficulty: Easy

Question ID 76f44a77

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 76f44a77

The function f is defined by $f(x) = 8x$. For what value of x does $f(x) = 72$?

A. 8

B. 9

C. 64

D. 80

ID: 76f44a77 Answer

Correct Answer: B

Rationale

Choice B is correct. Substituting 72 for $f(x)$ in the given function yields $72 = 8x$. Dividing each side of this equation by 8 yields $9 = x$. Therefore, $f(x) = 72$ when the value of x is 9.

Choice A is incorrect. This is the value of x for which $f(x) = 64$, not $f(x) = 72$.

Choice C is incorrect. This is the value of x for which $f(x) = 512$, not $f(x) = 72$.

Choice D is incorrect. This is the value of x for which $f(x) = 640$, not $f(x) = 72$.

Question Difficulty: Easy

Question ID 4c580285

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 4c580285

The function f is defined by the equation $f(x) = 7x + 2$. What is the value of $f(x)$ when $x = 4$?

ID: 4c580285 Answer

Correct Answer: 30

Rationale

The correct answer is 30. The value of $f(x)$ when $x = 4$ can be found by substituting 4 for x in the given equation $f(x) = 7x + 2$. This yields $f(4) = 7(4) + 2$, or $f(4) = 30$. Therefore, when $x = 4$, the value of $f(x)$ is 30.

Question Difficulty: Easy

Question ID dc85c551

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: dc85c551

$$d = 16t$$

The given equation represents the distance d, in inches, where t represents the number of seconds since an object started moving. Which of the following is the best interpretation of 16 in this context?

A. The object moved a total of 16 inches.

B. The object moved a total of $16t$ inches.

C. The object is moving at a rate of 16 inches per second.

D. The object is moving at a rate of $\frac{1}{16}$ inches per second.

ID: dc85c551 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that in the equation $d = 16t$, d represents the distance, in inches, and t represents the number of seconds since an object started moving. In this equation, t is being multiplied by 16. This means that the object's distance increases by 16 inches each second. Therefore, the best interpretation of 16 in this context is that the object is moving at a rate of 16 inches per second.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect. This is the best interpretation of $16t$, rather than 16, in this context.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 15bcfa0b

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 15bcfa0b

The function f is defined by $f(x) = 4x$. For what value of x does $f(x) = 8$?

ID: 15bcfa0b Answer

Correct Answer: 2

Rationale

The correct answer is 2. Substituting 8 for $f(x)$ in the given equation yields $8 = 4x$. Dividing the left- and right-hand sides of this equation by 4 yields $x = 2$. Therefore, the value of x is 2 when $f(x) = 8$.

Question Difficulty: Easy

Question ID 5eeef20e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 5eeef20e

A veterinarian recommends that each day a certain rabbit should eat 25 calories per pound of the rabbit's weight, plus an additional 11 calories. Which equation represents this situation, where c is the total number of calories the veterinarian recommends the rabbit should eat each day if the rabbit's weight is x pounds?

A. $c = 25x$

B. $c = 36x$

C. $c = 11x + 25$

D. $c = 25x + 11$

ID: 5eeef20e Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that a veterinarian recommends that each day the rabbit should eat 25 calories per pound of the rabbit's weight, plus an additional 11 calories. If the rabbit's weight is x pounds, then multiplying 25 calories per pound by the rabbit's weight, x pounds, yields $25x$ calories. Adding the additional 11 calories that the rabbit should eat each day yields $25x + 11$ calories. It's given that c is the total number of calories the veterinarian recommends the rabbit should eat each day if the rabbit's weight is x pounds. Therefore, this situation can be represented by the equation $c = 25x + 11$.

Choice A is incorrect. This equation represents a situation where a veterinarian recommends that each day the rabbit should eat 25 calories per pound of the rabbit's weight.

Choice B is incorrect. This equation represents a situation where a veterinarian recommends that each day the rabbit should eat $25 + 11$, or 36, calories per pound of the rabbit's weight.

Choice C is incorrect. This equation represents a situation where a veterinarian recommends that each day the rabbit should eat 11 calories per pound of the rabbit's weight, plus an additional 25 calories.

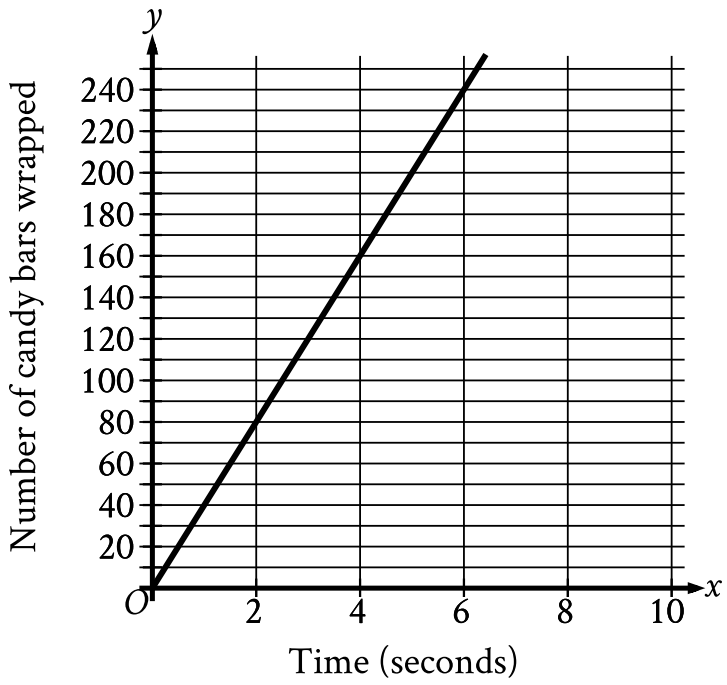
Question Difficulty: Easy

Question ID b15c634e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: b15c634e

The graph shown models the number of candy bars a certain machine wraps with a label in x seconds.



According to the graph, what is the estimated number of candy bars the machine wraps with a label per second?

A. 2

B. 40

C. 78

D. 80

ID: b15c634e Answer

Correct Answer: B

Rationale

Choice B is correct. For the graph shown, the *x*-axis represents time, in seconds, and the *y*-axis represents the number of candy bars wrapped. The slope of a line in the *xy*-plane is the change in y for each 1-unit increase in x. It follows that the slope of the graph shown represents the estimated number of candy bars the machine wraps with a label per second. The slope, m, of a line in the *xy*-plane can be found using any two points, (x_1, y_1) and (x_2, y_2), on the line and the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. The graph shown passes through the points $(0, 0)$ and $(2, 80)$. Substituting these points for (x_1, y_1) and (x_2, y_2), respectively, in the slope formula yields $m = \frac{80 - 0}{2 - 0}$, which is equivalent to $m = \frac{80}{2}$, or $m = 40$. Therefore, the estimated number of candy bars the machine wraps with a label per second is 40.

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.

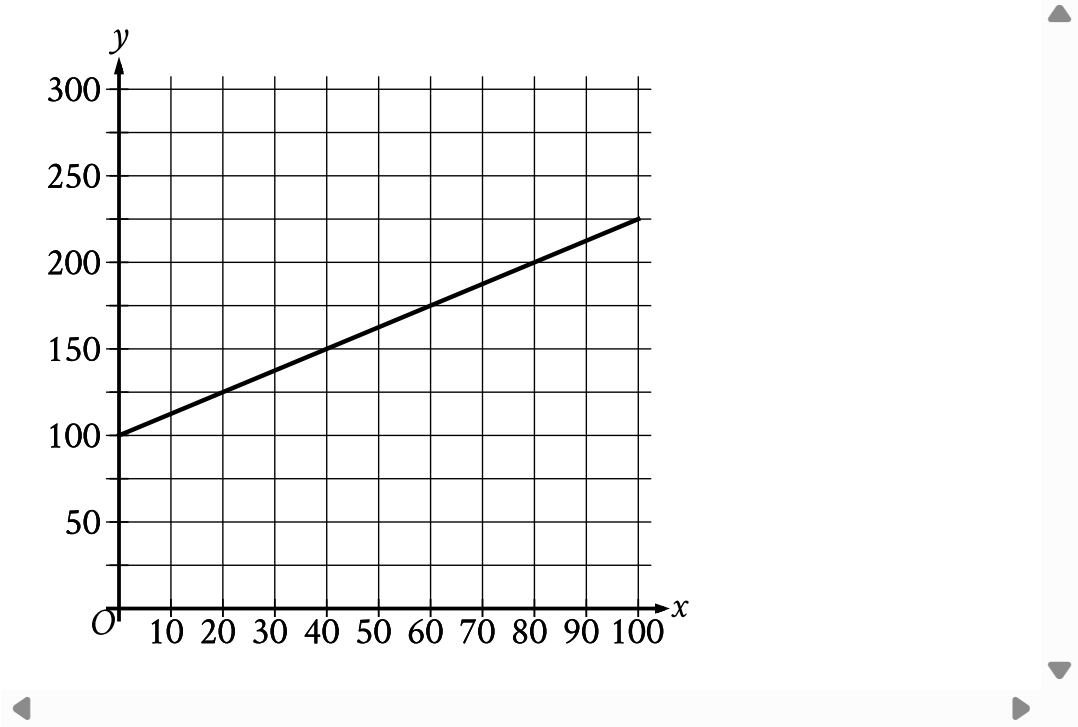
Question Difficulty: Easy

Question ID a4e1df2e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: a4e1df2e

The cost y, in dollars, for a manufacturer to make x rings is represented by the line shown.



What is the cost, in dollars, for the manufacturer to make 60 rings?

A. 100

B. 125

C. 175

D. 225

ID: a4e1df2e Answer

Correct Answer: C

Rationale

Choice C is correct. The line shown represents the cost y, in dollars, for a manufacturer to make x rings. For the line shown, the x-axis represents the number of rings made by the manufacturer and the y-axis represents the cost, in dollars. Therefore, the cost, in dollars, for the manufacturer to make 60 rings is represented by the y-coordinate of the point on the line that has an x-coordinate of 60. The point on the line with an x-coordinate of 60 has a y-coordinate of 175. Therefore, the cost, in dollars, for the manufacturer to make 60 rings is 175.

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

Choice B is incorrect. This is the cost, in dollars, for the manufacturer to make 20 rings.

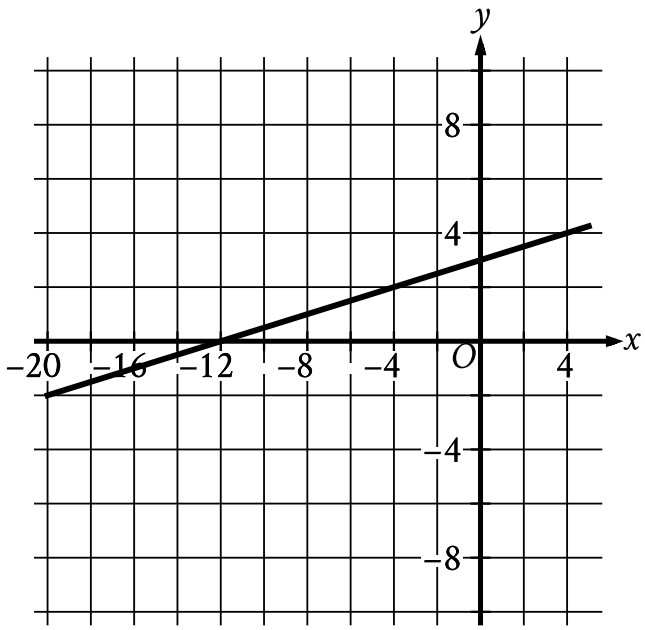
Choice D is incorrect. This is the cost, in dollars, for the manufacturer to make 100 rings.

Question Difficulty: Easy

Question ID 7d9d3fb4

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 7d9d3fb4



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

A. $(-12, 0)$

B. $(0, 0)$

C. $\left(\frac{1}{4}, 0\right)$

D. $(12, 0)$

ID: 7d9d3fb4 Answer

Correct Answer: A

Rationale

Choice A is correct. The *x*-intercept of a graph is the point where the graph intersects the *x*-axis. The graph of function f, where $y = f(x)$, intersects the *x*-axis at $(-12, 0)$. Therefore, the *x*-intercept of the graph of f is $(-12, 0)$.

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 0e2e504f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 0e2e504f

The function f is defined by $f(x) = \frac{1}{10}x - 2$. What is the *y*-intercept of the graph of $y = f(x)$ in the *xy*-plane?

A. $(-2, 0)$

B. $(0, -2)$

C. $(0, \frac{1}{10})$

D. $(\frac{1}{10}, 0)$

ID: 0e2e504f Answer

Correct Answer: B

Rationale

Choice B is correct. The *y*-intercept of the graph of a function in the *xy*-plane is the point on the graph where $x = 0$. It's given that $f(x) = \frac{1}{10}x - 2$. Substituting 0 for x in this equation yields $f(0) = \frac{1}{10}(0) - 2$, or $f(0) = -2$. Since it's given that $y = f(x)$, it follows that $y = -2$ when $x = 0$. Therefore, the *y*-intercept of the graph of $y = f(x)$ in the *xy*-plane 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 3c80bb57

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 3c80bb57

The total cost $f(x)$, in dollars, to lease a car for 36 months from a particular car dealership is given by $f(x) = 36x + 1{,}000$, where x is the monthly payment, in dollars. What is the total cost to lease a car when the monthly payment is $\$400$?

A. $\$13{,}400$

B. $\$13{,}000$

C. $\$15{,}400$

D. $\$37{,}400$

ID: 3c80bb57 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that $f(x)$ is the total cost, in dollars, to lease a car from this dealership with a monthly payment of x dollars. Therefore, the total cost, in dollars, to lease the car when the monthly payment is $\$400$ is represented by the value of $f(x)$ when $x = 400$. Substituting 400 for x in the equation $f(x) = 36x + 1{,}000$ yields $f(400) = 36(400) + 1{,}000$, or $f(400) = 15{,}400$. Thus, when the monthly payment is $\$400$, the total cost to lease a car is $\$15{,}400$.

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 61ab5e49

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 61ab5e49

The function f is defined by $f(x) = 80 - 6x$. What is the value of $f(7)$?

A. 13

B. 38

C. 74

D. 81

ID: 61ab5e49 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that function f is defined by $f(x) = 80 - 6x$. The value of $f(7)$ can be found by substituting 7 for x in the given function, which yields $f(7) = 80 - 6(7)$, or $f(7) = 80 - 42$, which is equivalent to $f(7) = 38$. Therefore, the value of $f(7)$ is 38.

Choice A is incorrect. This is the value of $80 - 67$, not $80 - 6(7)$.

Choice C is incorrect. This is the value of $80 - 6(1)$, not $80 - 6(7)$.

Choice D is incorrect. This is the value of $80 - 6 + 7$, not $80 - 6(7)$.

Question Difficulty: Easy

Question ID 4453d265

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 4453d265

The number y is 84 less than the number x. Which equation represents the relationship between x and y?

A. $y = x + 84$

B. $y = \frac{1}{84}x$

C. $y = 84x$

D. $y = x - 84$

ID: 4453d265 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the number y is 84 less than the number x. A number that's 84 less than the number x is equivalent to 84 subtracted from the number x, or $x - 84$. Therefore, the equation $y = x - 84$ represents the relationship between x and y.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

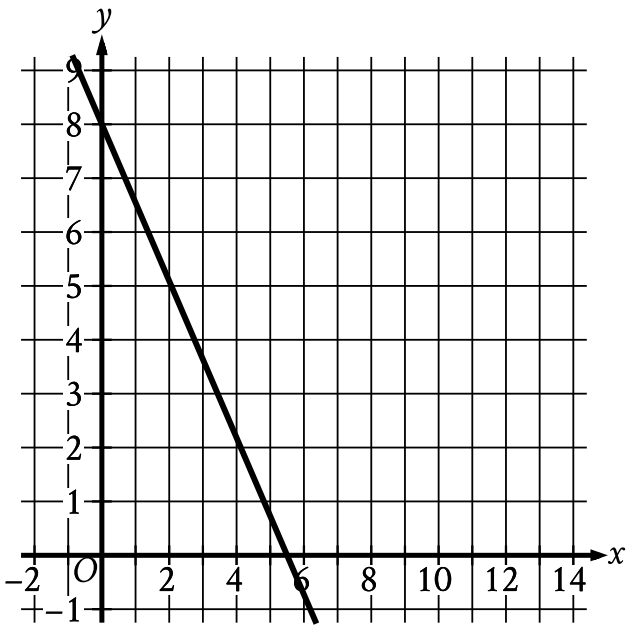
Choice C is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID 99235d83

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 99235d83



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

A. $(0, 0)$

B. $\left(0, -\frac{16}{11}\right)$

C. $(0, -8)$

D. $(0, 8)$

ID: 99235d83 Answer

Correct Answer: D

Rationale

Choice D is correct. The *y*-intercept of a graph is the point where the graph intersects the *y*-axis. The graph of function f shown intersects the *y*-axis at the point $(0, 8)$. Therefore, the *y*-intercept of the graph of f is $(0, 8)$.

Choice A is incorrect. This is the point where the *x*-axis, not the graph of f, intersects the *y*-axis.

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 87bd4e09

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 87bd4e09

The function f is defined by the equation $f(x) = 100x + 2$. What is the value of $f(x)$ when $x = 9$?

A. 111

B. 118

C. 900

D. 902

ID: 87bd4e09 Answer

Correct Answer: D

Rationale

Choice D is correct. Substituting 9 for x in the given equation yields $f(9) = 100(9) + 2$, or $f(9) = 902$. Therefore, the value of $f(x)$ when $x = 9$ is 902.

Choice A is incorrect. This is the value of $f(x)$ when $x = 1.09$.

Choice B is incorrect. This is the value of $f(x)$ when $x = 1.16$.

Choice C is incorrect. This is the value of $f(x)$ when $x = 8.98$.

Question Difficulty: Easy

Question ID 6bd32629

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 6bd32629

$$f(x) = 7x + 1$$

The function gives the total number of people on a company retreat with x managers. What is the total number of people on a company retreat with 7 managers?

ID: 6bd32629 Answer

Correct Answer: 50

Rationale

The correct answer is 50. It's given that the function f gives the total number of people on a company retreat with x managers. It's also given that 7 managers are on the company retreat. Substituting 7 for x in the given function yields $f(7) = 7(7) + 1$, or $f(7) = 50$. Therefore, there are a total of 50 people on a company retreat with 7 managers.

Question Difficulty: Easy

Question ID 6a8610a5

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 6a8610a5

If $y = 5x + 10$, what is the value of y when $x = 8$?

ID: 6a8610a5 Answer

Correct Answer: 50

Rationale

The correct answer is 50. Substituting 8 for x in the given equation yields $y = 5(8) + 10$, or $y = 50$. Therefore, the value of y is 50 when $x = 8$.

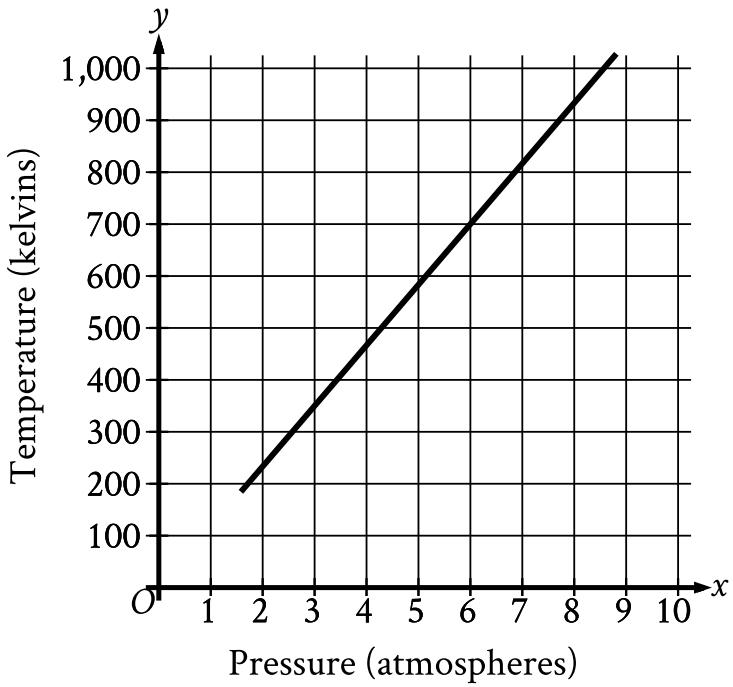
Question Difficulty: Easy

Question ID 8b896724

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 8b896724

Oxygen gas is placed inside a tank with a constant volume. The graph shows the estimated temperature y, in kelvins, of the oxygen gas when its pressure is x atmospheres.



What is the estimated temperature, in kelvins, of the oxygen gas when its pressure is 6 atmospheres?

A. 6

B. 60

C. 700

D. 760

ID: 8b896724 Answer

Correct Answer: C

Rationale

Choice C is correct. For the graph shown, the x-axis represents pressure, in atmospheres, and the y-axis represents temperature, in kelvins. Therefore, the estimated temperature, in kelvins, of the oxygen gas when its pressure is 6 atmospheres is represented by the y-coordinate of the point on the graph that has an x-coordinate of 6. The point on the graph with an x-coordinate of 6 has a y-coordinate of approximately 700. Therefore, the estimated temperature, in kelvins, of the oxygen gas when its pressure is 6 atmospheres is 700.

Choice A is incorrect. This is the pressure, in atmospheres, not the estimated temperature, in kelvins, of the oxygen gas when its pressure is 6 atmospheres.

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 273c9f49

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 273c9f49

The function h is defined by $h(x) = 3x - 7$. What is the value of $h(-2)$?

A. -13

B. -10

C. 10

D. 13

ID: 273c9f49 Answer

Correct Answer: A

Rationale

Choice A is correct. The value of $h(-2)$ can be found by substituting -2 for x in the equation defining h. Substituting -2 for x in $h(x) = 3x - 7$ yields $h(-2) = 3(-2) - 7$, or $h(-2) = -13$. Therefore, the value of $h(-2)$ is -13.

Choice B is incorrect. This is the value of $h(-1)$, not $h(-2)$.

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 675325b9

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 675325b9

Hana deposited a fixed amount into her bank account each month. The function $f(t) = 100 + 25t$ gives the amount, in dollars, in Hana's bank account after t monthly deposits. What is the best interpretation of 25 in this context?

A. With each monthly deposit, the amount in Hana's bank account increased by $\$25$.

B. Before Hana made any monthly deposits, the amount in her bank account was $\$25$.

C. After 1 monthly deposit, the amount in Hana's bank account was $\$25$.

D. Hana made a total of 25 monthly deposits.

ID: 675325b9 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that t represents the number of monthly deposits. In the given function $f(t) = 100 + 25t$, the coefficient of t is 25. This means that for every increase in the value of t by 1, the value of $f(t)$ increases by 25. It follows that with each monthly deposit, the amount in Hana's bank account increased by $\$25$.

Choice B is incorrect. Before Hana made any monthly deposits, the amount in her bank account was $\$100$.

Choice C is incorrect. After 1 monthly deposit, the amount in Hana's bank account was $\$125$.

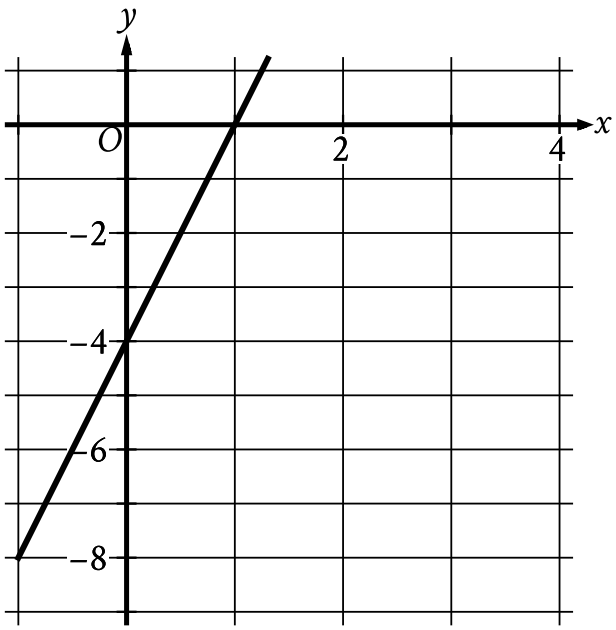
Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Easy

Question ID f717089b

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: f717089b



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

A. $(0, -1)$

B. $(0, -4)$

C. $(0, 1)$

D. $(0, 4)$

ID: f717089b Answer

Correct Answer: B

Rationale

Choice B is correct. The *y*-intercept of a graph is the point where the graph intersects the *y*-axis. The graph of function f shown intersects the *y*-axis at the point $(0, -4)$. Therefore, the *y*-intercept of the graph is $(0, -4)$.

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 f66cba39

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: f66cba39

Sean rents a tent at a cost of $\$11$ per day plus a onetime insurance fee of $\$10$. Which equation represents the total cost c, in dollars, to rent the tent with insurance for d days?

A. $c = 11(d + 10)$

B. $c = 10(d + 11)$

C. $c = 11d + 10$

D. $c = 10d + 11$

ID: f66cba39 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that the cost of renting a tent is $\$11$ per day for d days. Multiplying the rental cost by the number of days yields $\$11d$, which represents the cost of renting the tent for d days before the insurance is added. Adding the onetime insurance fee of $\$10$ to the rental cost of $\$11d$ gives the total cost c, in dollars, which can be represented by the equation $c = 11d + 10$.

Choice A is incorrect. This equation represents the total cost to rent the tent if the insurance fee was charged every day.

Choice B is incorrect. This equation represents the total cost to rent the tent if the daily fee was $\$(d + 11)$ for 10 days.

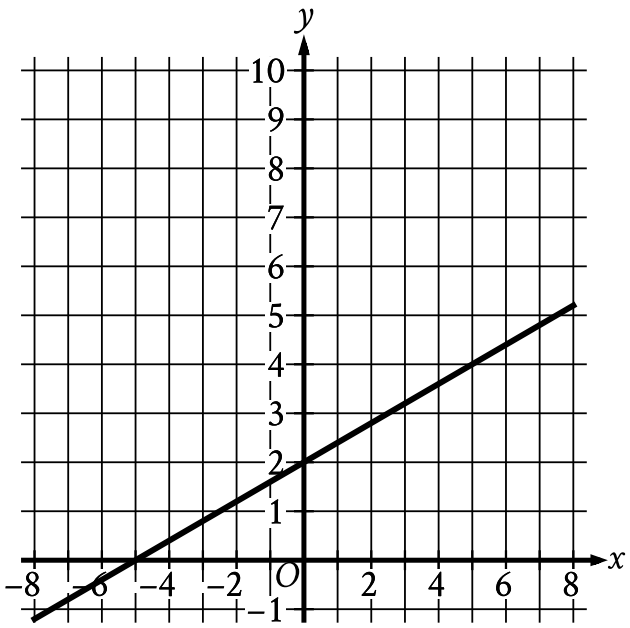
Choice D is incorrect. This equation represents the total cost to rent the tent if the daily fee was $\$10$ and the onetime fee was $\$11$.

Question Difficulty: Easy

Question ID 1e0a38e7

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 1e0a38e7



The graph of the linear function f is shown. What is the *y*-intercept of the graph of $y = f(x)$?

A. $(-5, 0)$

B. $(2, 0)$

C. $(0, 2)$

D. $(0, -5)$

ID: 1e0a38e7 Answer

Correct Answer: C

Rationale

Choice C is correct. The *y*-intercept of a graph is the point where the graph intersects the *y*-axis. The graph of $y = f(x)$ shown intersects the *y*-axis at the point $(0, 2)$. Therefore, the *y*-intercept of the graph of $y = f(x)$ is $(0, 2)$.

Choice A is incorrect. This is the *x*-intercept, not the *y*-intercept, of the graph of $y = f(x)$.

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 afcbd26d

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: afcbd26d

The length, y, of a white whale was 162 centimeters (cm) when it was born and increased an average of 4.8 cm per month for the first 12 months after it was born. Which equation best represents this situation, where x is the number of months after the whale was born and y is the length, in cm, of the whale?

A. $y = 162x$

B. $y = 162x + 162$

C. $y = 4.8x + 4.8$

D. $y = 4.8x + 162$

ID: afcbd26d Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the length of the whale was 162 cm when it was born and that its length increased an average of 4.8 cm per month for the first 12 months after it was born. Since x represents the number of months after the whale was born, the total increase in the whale's length, in cm, is 4.8 times x, or $4.8x$. The length of the whale y, in cm, can be found by adding the whale's length at birth, 162 cm, to the total increase in length, $4.8x$ cm. Therefore, the equation that best represents this situation is $y = 4.8x + 162$.

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 13b10306

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 13b10306

$$d = 16 - \frac{x}{30}$$

The equation shown gives the estimated amount of diesel d, in gallons, that remains in the gas tank of a truck after being driven x miles, where $0 \leq x \leq 480$. What is the estimated amount of diesel, in gallons, that remains in the gas tank of the truck when $x = 300$?

A. 0

B. 6

C. 14

D. 16

ID: 13b10306 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the equation $d = 16 - \frac{x}{30}$ gives the estimated amount of diesel d, in gallons, that remains in the gas tank of the truck after being driven x miles. Substituting 300 for x in the given equation yields $d = 16 - \frac{300}{30}$, which is equivalent to $d = 16 - 10$, or $d = 6$. Therefore, the estimated amount of diesel that remains in the gas tank of the truck when $x = 300$ is 6 gallons.

Choice A is incorrect. This is the estimated amount of diesel, in gallons, that will remain in the gas tank of the truck when $x = 480$, not when $x = 300$.

Choice C is incorrect. This is the estimated amount of diesel, in gallons, that will remain in the gas tank of the truck when $x = 60$, not when $x = 300$.

Choice D is incorrect. This is the estimated amount of diesel, in gallons, that will remain in the gas tank of the truck when $x = 0$, not when $x = 300$.

Question Difficulty: Easy

Question ID d60b089f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: d60b089f

The function f is defined by $f(x) = 3x - 8$. What is the value of $f(7)$?

A. 29

B. 13

C. -5

D. -29

ID: d60b089f Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the function f is defined by $f(x) = 3x - 8$. The value of $f(7)$ is the value of $f(x)$ when $x = 7$. Substituting 7 for x in the given equation yields $f(7) = 3(7) - 8$, which is equivalent to $f(7) = 21 - 8$, or $f(7) = 13$.

Choice A is incorrect. This is the value of $f(7)$ when $f(x) = 3x + 8$, rather than $f(x) = 3x - 8$.

Choice C is incorrect. This is the value of $f(1)$, rather than $f(7)$.

Choice D is incorrect. This is the value of $f(-7)$, rather than $f(7)$.

Question Difficulty: Easy

Question ID df59edf3

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: df59edf3

A bus is traveling at a constant speed along a straight portion of road. The equation $d = 30t$ gives the distance d, in feet from a road marker, that the bus will be t seconds after passing the marker. How many feet from the marker will the bus be 2 seconds after passing the marker?

A. 30

B. 32

C. 60

D. 90

ID: df59edf3 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that t represents the number of seconds after the bus passes the marker. Substituting 2 for t in the given equation $d = 30t$ yields $d = 30(2)$, or $d = 60$. Therefore, the bus will be 60 feet from the marker 2 seconds after passing it.

Choice A is incorrect. This is the distance, in feet, the bus will be from the marker 1 second, not 2 seconds, after passing it.

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

Choice D is incorrect. This is the distance, in feet, the bus will be from the marker 3 seconds, not 2 seconds, after passing it.

Question Difficulty: Easy

Question ID d76c37db

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: d76c37db

For a training program, Juan rides his bike at an average rate of 5.7 minutes per mile. Which function m models the number of minutes it will take Juan to ride x miles at this rate?

A. $m(x) = \frac{x}{5.7}$

B. $m(x) = x + 5.7$

C. $m(x) = x - 5.7$

D. $m(x) = 5.7x$

ID: d76c37db Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that Juan rides his bike at an average rate of 5.7 minutes per mile. The number of minutes it will take Juan to ride x miles can be determined by multiplying his average rate by the number of miles, x, which yields $5.7x$. Therefore, the function $m(x) = 5.7x$ models the number of minutes it will take Juan to ride x miles.

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 5ebcd502

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 5ebcd502

A contract for a certain service requires a onetime activation cost of $\$35$ and a monthly cost of $\$23$. Which equation represents this situation, where c is the total cost, in dollars, of this service contract for t months?

A. $c = \frac{t}{23} + 35$

B. $c = \frac{t}{35} + 23$

C. $c = 23t + 35$

D. $c = 35t + 23$

ID: 5ebcd502 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that this service contract requires a monthly cost of $\$23$. A monthly cost of $\$23$ for t months results in a cost of $\$23t$. It's also given that this service contract requires a onetime activation cost of $\$35$. Adding the onetime activation cost to the monthly cost of the service contract for t months yields the total cost c, in dollars, of this service contract for t months. Therefore, this situation can be represented by the equation $c = 23t + 35$.

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.

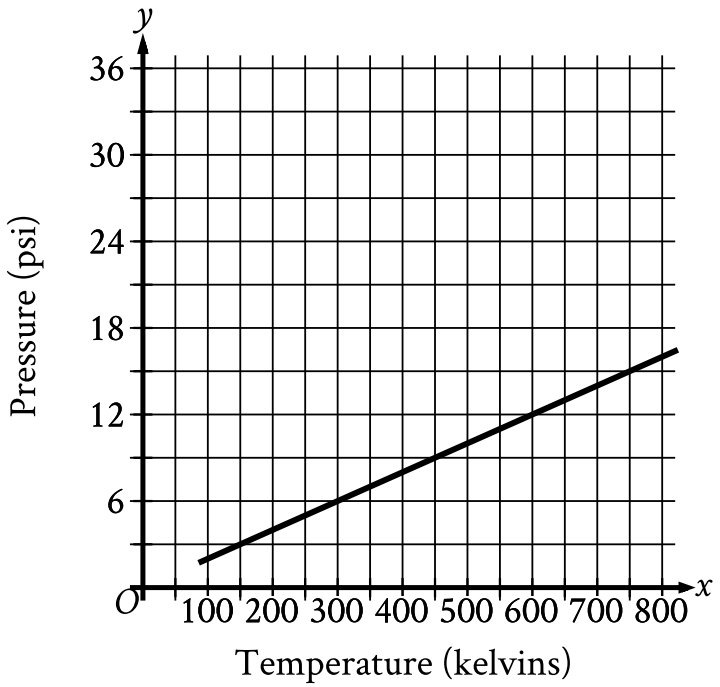
Question Difficulty: Easy

Question ID fa6dad4f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: fa6dad4f

Argon is placed inside a container with a constant volume. The graph shows the estimated pressure y, in pounds per square inch (psi), of the argon when its temperature is x kelvins.



What is the estimated pressure of the argon, in psi, when the temperature is 600 kelvins?

A. 6

B. 12

C. 300

D. 600

ID: fa6dad4f Answer

Correct Answer: B

Rationale

Choice B is correct. For the graph shown, the x-axis represents temperature, in kelvins, and the y-axis represents the estimated pressure, in pounds per square inch (psi). The estimated pressure of the argon when the temperature is 600 kelvins can be found by locating the point on the graph where the value of x is equal to 600. The graph passes through the point $(600, 12)$. This means that when the temperature is 600 kelvins, the estimated pressure is 12 psi.

Choice A is incorrect. This is the estimated pressure, in psi, of the argon when the temperature is 300 kelvins, not 600 kelvins.

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

Choice D is incorrect. This is the temperature, in kelvins, of the argon.

Question Difficulty: Easy

Question ID 552ce561

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 552ce561

$$s = 40 + 3t$$

The equation gives the speed s, in miles per hour, of a certain car t seconds after it began to accelerate. What is the speed, in miles per hour, of the car 5 seconds after it began to accelerate?

A. 40

B. 43

C. 45

D. 55

ID: 552ce561 Answer

Correct Answer: D

Rationale

Choice D is correct. In the given equation, s is the speed, in miles per hour, of a certain car t seconds after it began to accelerate. Therefore, the speed of the car, in miles per hour, 5 seconds after it began to accelerate can be found by substituting 5 for t in the given equation, which yields $s = 40 + 3(5)$, or $s = 55$. Thus, the speed of the car 5 seconds after it began to accelerate is 55 miles per hour.

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 9f0eba60

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: 9f0eba60

The function f is defined by $f(x) = 4x - 3$. What is the value of $f(10)$?

A. -30

B. 37

C. 40

D. 43

ID: 9f0eba60 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the function f is defined by $f(x) = 4x - 3$. Substituting 10 for x in the given function yields $f(10) = 4(10) - 3$, which is equivalent to $f(10) = 40 - 3$, or $f(10) = 37$. Therefore, the value of $f(10)$ is 37.

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

Choice C is incorrect. This is the value of $f(10)$ for the function $f(x) = 4x$, not $f(x) = 4x - 3$.

Choice D is incorrect. This is the value of $f(10)$ for the function $f(x) = 4x + 3$, not $f(x) = 4x - 3$.

Question Difficulty: Easy

Question ID b3e6012b

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear functions	

ID: b3e6012b

To repair a refrigerator, a technician charges $\$60$ per hour for labor plus $\$120$ for parts. Which function f represents the total amount, in dollars, the technician will charge for this job if it takes x hours?

A. $f(x) = x + 120$

B. $f(x) = 60x$

C. $f(x) = 60x + 120$

D. $f(x) = 60x - 120$

ID: b3e6012b Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that the technician charges $\$60$ per hour for labor. Therefore, if the job takes x hours, the technician will charge $\left(\frac{\$60}{1 \text{ hour}}\right)(x \text{ hours})$, or $\$60x$, for labor. It's also given that the technician charges $\$120$ for parts. Therefore, $f(x) = 60x + 120$ represents the total amount, in dollars, the technician will charge for this job if it takes x hours.

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

Choice B is incorrect. This function represents the total amount, in dollars, the technician charges for labor only, not the total amount charged for labor and parts.

Choice D is incorrect. This function represents the total amount, in dollars, the technician would charge if the charge for parts were subtracted from, rather than added to, the charge for labor.

Question Difficulty: Easy