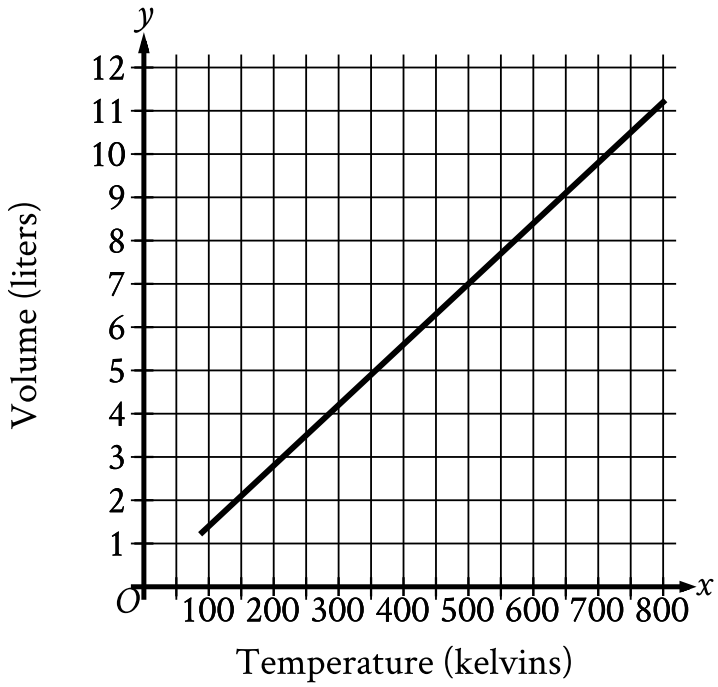
Question ID 20562018

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 20562018

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: 20562018 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: Medium

Question ID 54992d37

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 54992d37

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: 54992d37 Answer

Correct Answer: D

Rationale

Choice D is correct. The value of gx when $x = 8$ can be found by substituting 8 for x in the given equation $gx = 10x + 8$. This yields $g8 = 108 + 8$, or $g8 = 88$. Therefore, when $x = 8$, the value of gx is 88.

Choice A is incorrect. This is the value of x when $gx = 8$, rather than the value of gx 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: Medium

Question ID 128943f2

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 128943f2

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: 128943f2 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the function f is defined by $fx = 4x$ - 3. Substituting 10 for x in the given function yields $f10 = 410$ - 3, which is equivalent to $f10 = 40$ - 3, or $f10 = 37$. Therefore, the value of $f10$ is 37.

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

Choice C is incorrect. This is the value of $f10$ for the function $fx = 4x$, not $fx = 4x$ - 3.

Choice D is incorrect. This is the value of $f10$ for the function $fx = 4x + 3$, not $fx = 4x$ - 3.

Question Difficulty: Medium

Question ID e2a76ea9

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: e2a76ea9

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: e2a76ea9 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 $mx = 5.7x$ 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: Medium

Question ID 453e6c36

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 453e6c36

$$d = 16t$$

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: 453e6c36 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: Medium

Question ID 3bdfa76a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 3bdfa76a

$$f(x) = 4x + b$$

For the linear function f, b is a constant and $f(7) = 28$. What is the value of b?

A. 0

B. 1

C. 4

D. 7

ID: 3bdfa76a Answer

Correct Answer: A

Rationale

Choice A is correct. For the linear function f, it's given that $f7 = 28$. Substituting 7 for x and 28 for fx in the given function yields $28 = 47 + b$, or $28 = 28 + b$. Subtracting 28 from each side of this equation yields $0 = b$. Therefore, the value of b is 0.

Choice B is incorrect. Substituting 1 for b in the given function yields $fx = 4x + 1$. For this function, when the value of x is 7, the value of fx is 29, not 28.

Choice C is incorrect. Substituting 4 for b in the given function yields $fx = 4x + 4$. For this function, when the value of x is 7, the value of fx is 32, not 28.

Choice D is incorrect. Substituting 7 for b in the given function yields $fx = 4x + 7$. For this function, when the value of x is 7, the value of fx is 35, not 28.

Question Difficulty: Medium

Question ID e59b14c8

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: e59b14c8

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: e59b14c8 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: Medium

Question ID 866abd4d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 866abd4d

$$f(x) = 14 + 4x$$

The function f represents the total cost, in dollars, of attending an arcade when x games are played. How many games can be played for a total cost of $58?

ID: 866abd4d Answer

Correct Answer: 11

Rationale

The correct answer is 11. It's given that the function $fx = 14 + 4x$ represents the total cost, in dollars, of attending an arcade when x games are played. Substituting 58 for fx in the given equation yields $58 = 14 + 4x$. Subtracting 14 from each side of this equation yields $44 = 4x$. Dividing each side of this equation by 4 yields $11 = x$. Therefore, 11 games can be played for a total cost of $\$ 58$.

Question Difficulty: Medium

Question ID 9966047c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 9966047c

For the linear function f, $f(0) = 17$ and $f(1) = 17$. Which equation defines f?

A. $f(x) = \frac{1}{17}$

B. $f(x) = 1$

C. $f(x) = 17$

D. $f(x) = 34$

ID: 9966047c Answer

Correct Answer: C

Rationale

Choice C is correct. An equation defining the linear function f can be written in the form $fx = mx + b$, where m is the slope and $0, b$ is the *y*-intercept of the graph of $y = fx$ in the *xy*-plane. The slope of the graph of $y = fx$ can be found using the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$, where x_1, y_1 and x_2, y_2 are any two points that the graph passes through. If $f0 = 17$, it follows that the graph of $y = fx$ passes through the point $0, 17$. If $f1 = 17$, it follows that the graph of $y = fx$ passes through the point $1, 17$. Substituting $0, 17$ and $1, 17$ for x_1, y_1 and x_2, y_2, respectively, in the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ yields $m = \frac{17 - 17}{1 - 0}$, which is equivalent to $m = \frac{0}{1}$, or $m = 0$. Since the graph of $y = fx$ passes through $0, 17$, it follows that $b = 17$. Substituting 0 for m and 17 for b in the equation $fx = mx + b$ yields $fx = 0x + 17$, or $fx = 17$. Thus, the equation that defines f is $fx = 17$.

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: Medium

Question ID d6de4c72

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: d6de4c72

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: d6de4c72 Answer

Correct Answer: B

Rationale

Choice B is correct. An equation defining a linear function can be written in the form $fx = mx + b$, where m and b are constants, m is the slope of the graph of $y = fx$ 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 $y = fx$ 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 $fx = mx + b$ yields $fx = 3x - 8$. Thus, the equation that defines f is $fx = 3x - 8$.

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

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

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

Question Difficulty: Medium

Question ID 39f6e4e8

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 39f6e4e8

The function f is defined by $f(x) = \frac{7}{10}x + 55$. What is the value of $f(20)$?

ID: 39f6e4e8 Answer

Correct Answer: 69

Rationale

The correct answer is 69. The value of $f(20)$ can be found by evaluating the function $f(x) = \frac{7}{10}x + 55$ for $x = 20$. Substituting 20 for x in this function yields $f(20) = \frac{7}{10}(20) + 55$, or $f(20) = 69$. Therefore, the value of $f(20)$ is 69.

Question Difficulty: Medium

Question ID dfe1a300

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: dfe1a300

In the linear function h, $h(0) = 41$ and $h(1) = 40$. Which equation defines h?

A. $h(x) = -x + 41$

B. $h(x) = -x$

C. $h(x) = -41x$

D. $h(x) = -41$

ID: dfe1a300 Answer

Correct Answer: A

Rationale

Choice A is correct. An equation defining a linear function can be written in the form $hx = ax + b$, where a and b are constants. It's given that $h0 = 41$. Substituting 0 for x and 41 for hx in the equation $hx = ax + b$ yields $41 = a0 + b$, or $b = 41$. Substituting 41 for b in the equation $hx = ax + b$ yields $hx = ax + 41$. It's also given that $h1 = 40$. Substituting 1 for x and 40 for hx in the equation $hx = ax + 41$ yields $40 = a1 + 41$, or $40 = a + 41$. Subtracting 41 from the left- and right-hand sides of this equation yields $-1 = a$. Substituting -1 for a in the equation $hx = ax + 41$ yields $hx = -1x + 41$, or $hx = -x + 41$.

Choice B is incorrect. Substituting 0 for x and 41 for hx in this equation yields $41 = -0$, which isn't a true statement.

Choice C is incorrect. Substituting 0 for x and 41 for hx in this equation yields $41 = -410$, or $41 = 0$, which isn't a true statement.

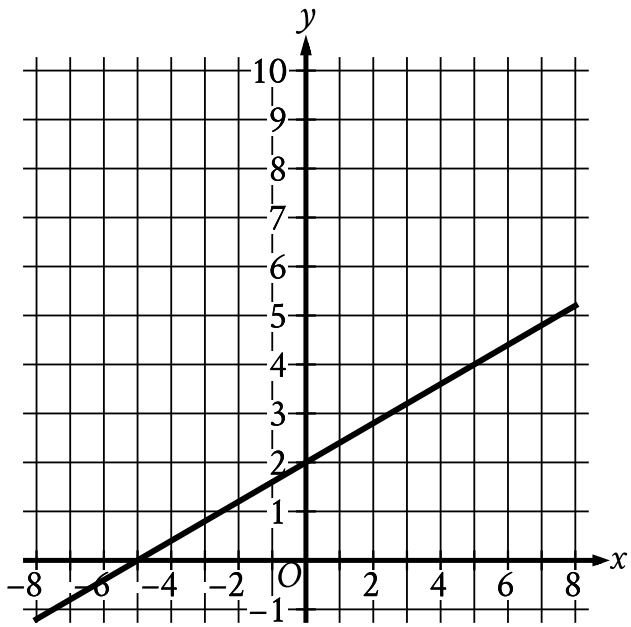
Choice D is incorrect. Substituting 41 for hx in this equation yields $41 = -41$, which isn't a true statement.

Question Difficulty: Medium

Question ID 28f49aaf

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 28f49aaf



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: 28f49aaf 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: Medium

Question ID b590994d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: b590994d

The function f is defined by $f(x) = \frac{1}{2}(x + 6)$. What is the value of $f(4)$?

A. 20

B. 12

C. 10

D. 5

ID: b590994d Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the function f is defined by $fx = \frac{1}{2}x + 6$. Substituting 4 for x in the given function yields $f4 = \frac{1}{2}4 + 6$, or $f4 = 5$. Therefore, the value of $f4$ is 5.

Choice A is incorrect. This is the value of $24 + 6$, not $\frac{1}{2}4 + 6$.

Choice B is incorrect. This is the value of $2 + 4 + 6$, not $\frac{1}{2}4 + 6$.

Choice C is incorrect. This is the value of $4 + 6$, not $\frac{1}{2}4 + 6$.

Question Difficulty: Medium

Question ID 429a5c49

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 429a5c49

The function f is defined by $f(x) = 5x + 8$. For what value of x does $f(x) = 58$?

A. 10

B. 13

C. 50

D. 298

ID: 429a5c49 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the function f is defined by $fx = 5x + 8$. Substituting 58 for fx in this equation yields $58 = 5x + 8$. Subtracting 8 from both sides of this equation yields $50 = 5x$. Dividing both sides of this equation by 5 yields $10 = x$. Therefore, the value of x when $fx = 58$ is 10.

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. This is the value of $f58$, not the value of x when $fx = 58$.

Question Difficulty: Medium

Question ID aa528598

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: aa528598

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: aa528598 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 $hx = 3x$ - 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: Medium

Question ID 2db60e9f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 2db60e9f

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: 2db60e9f Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that fx 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 fx when $x = 400$. Substituting 400 for x in the equation $fx = 36x + 1{,}000$ yields $f400 = 36400 + 1{,}000$, or $f400 = 15{,}400$. 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: Medium

Question ID 7a18ecbe

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 7a18ecbe

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: 7a18ecbe 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: Medium

Question ID 2c78116f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 2c78116f

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: 2c78116f Answer

Correct Answer: B

Rationale

Choice B is correct. Substituting 50 for x in the given function yields $h50 = 50 + 200$, or $h50 = 250$. Therefore, the value of $h50$ is 250.

Choice A is incorrect. This is the value of $h0$.

Choice C is incorrect. This is the value of $h9{,}800$.

Choice D is incorrect. This is the value of $h50{,}000$.

Question Difficulty: Medium

Question ID d86f3bf8

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: d86f3bf8

In science class, Diego conducted an experiment to learn about evaporation. Diego measured the height of fluid in a beaker over a period of time. The function $f(x) = 39 - 0.18x$ gives the estimated height, in centimeters (cm), of the fluid in the beaker x days after the start of the experiment. Which of the following is the best interpretation of 39 in this context?

A. The estimated height, in cm, of the fluid at the start of the experiment

B. The estimated height, in cm, of the fluid at the end of the experiment

C. The estimated change in the height, in cm, of the fluid each day

D. The estimated number of days for all the fluid to evaporate

ID: d86f3bf8 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the function $f(x) = 39 - 0.18x$ gives the estimated height, in centimeters (cm), of the fluid in the beaker x days after the start of the experiment. For a function defined by an equation of the form $f(x) = b + mx$, where m and b are constants, b represents the value of $f(x)$ when $x = 0$. It follows that in the given function, 39 represents the value of $f(x)$ when $x = 0$. Since $x = 0$ represents the start of the experiment, then the best interpretation of 39 in this context is that the estimated height, in cm, of the fluid was 39 at the start of the experiment.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect. The estimated change in the height, in cm, of the fluid each day is 0.18, not 39.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID 359de99c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 359de99c

The function g is defined by $g(x) = 4x - 6$. What is the value of $g(-7)$?

A. -34

B. -22

C. $-\frac{13}{4}$

D. $-\frac{1}{4}$

ID: 359de99c Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the function g is defined by $gx = 4x$ - 6. Substituting -7 for x into the given equation yields g-7 = 4-7 - 6, or g-7 = - 34.

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. This is the value of x for which $gx =$ - 7, not the value of g-7.

Question Difficulty: Medium

Question ID 28d1e562

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 28d1e562

$$s = 40 + 3t$$

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: 28d1e562 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 $s = 40 + 35$, 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.

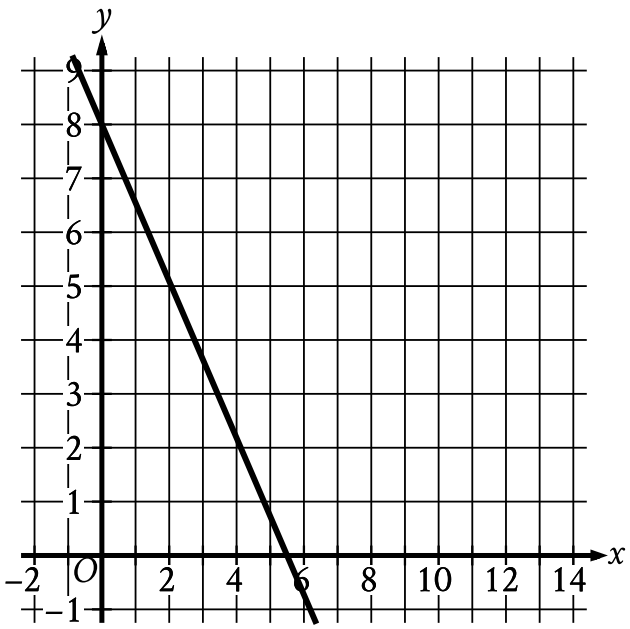
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 70267fc7

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 70267fc7



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: 70267fc7 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: Medium

Question ID 9082f4ab

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 9082f4ab

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

ID: 9082f4ab Answer

Correct Answer: 2

Rationale

The correct answer is 2. Substituting 8 for fx 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 $fx = 8$.

Question Difficulty: Medium

Question ID 541e97f5

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 541e97f5

Area (square feet)	Water (gallons)
2,520	4,536
3,780	6,804
5,040	9,072

The buildings of a shopping center are designed to allow water to drain from the roof into gutters on the sides of the buildings. The table shows the relationship between the area x, in square feet, of a roof and the amount of water $f(x)$, in gallons, drained from the roof into the gutters over a certain period of time. Which equation could define f?

A. $f(x) = 0.6x$

B. $f(x) = 1.8x$

C. $f(x) = 2{,}268x$

D. $f(x) = 4{,}536x$

ID: 541e97f5 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the table represents the relationship between the area x, in square feet, of the roof of a shopping center and the amount of water $f(x)$, in gallons, drained from the roof into the gutters. Every choice represents this relationship with an equation defining f in the form $f(x) = mx$, where m is a constant rate of change. The value of m can be determined by dividing both sides of the equation by x. Each of three pairs of x and $f(x)$ in the table yield $m = 1.8$, since $\frac{4{,}536}{2{,}520} = 1.8$, $\frac{6{,}804}{3{,}780} = 1.8$, and $\frac{9{,}072}{5{,}040} = 1.8$. Therefore, the equation $f(x) = 1.8x$ could define f.

Choice A is incorrect. For the roof with an area of $2{,}520$ square feet, this equation would yield $0.6(2{,}520)$, or $1{,}512$, gallons, not the $4{,}536$ gallons shown in the table.

Choice C is incorrect. For the roof with an area of $2{,}520$ square feet, this equation would yield $2{,}268(2{,}520)$, or $5{,}715{,}360$, gallons, not the $4{,}536$ gallons shown in the table.

Choice D is incorrect. For the roof with an area of $2{,}520$ square feet, this equation would yield $4{,}536(2{,}520)$, or $11{,}430{,}720$, gallons, not the $4{,}536$ gallons shown in the table.

Question Difficulty: Medium

Question ID 5b31baa1

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 5b31baa1

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

ID: 5b31baa1 Answer

Correct Answer: 30

Rationale

The correct answer is 30. The value of fx when $x = 4$ can be found by substituting 4 for x in the given equation $fx = \quad 7x + 2$. This yields $f4 = 74 + 2$, or $f4 = 30$. Therefore, when $x = 4$, the value of fx is 30.

Question Difficulty: Medium

Question ID c2007c9d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: c2007c9d

For the linear function f, the graph of $y = f(x)$ in the *xy*-plane has a slope of 39 and passes through the point $(0, 0)$. Which equation defines f?

A. $f(x) = -39x$

B. $f(x) = \frac{1}{39}x$

C. $f(x) = x - 39$

D. $f(x) = 39x$

ID: c2007c9d Answer

Correct Answer: D

Rationale

Choice D is correct. An equation defining a linear function can be written in the form $fx = mx + b$, where m is the slope and $0, b$ is the *y*-intercept of the graph of $y = fx$ in the *xy*-plane. It's given that the graph of $y = fx$ has a slope of 39, so $m = 39$. It's also given that the graph of $y = fx$ passes through the point $0, 0$, so $b = 0$. Substituting 39 for m and 0 for b in $fx = mx + b$ yields $fx = 39x + 0$, or $fx = 39x$. Thus, the equation that defines f is $fx = 39x$.

Choice A is incorrect. This equation defines a function whose graph has a slope of -39, not 39.

Choice B is incorrect. This equation defines a function whose graph has a slope of $\frac{1}{39}$, not 39.

Choice C is incorrect. This equation defines a function whose graph has a slope of 1, not 39, and passes through the point $0, -39$, not $0, 0$.

Question Difficulty: Medium

Question ID 526ec188

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 526ec188

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: 526ec188 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the function f is defined by $fx = 3x$ - 8. The value of $f7$ is the value of fx when $x = 7$. Substituting 7 for x in the given equation yields $f7 = 37$ - 8, which is equivalent to $f7 = 21$ - 8, or $f7 = 13$.

Choice A is incorrect. This is the value of $f7$ when $fx = 3x + 8$, rather than $fx = 3x$ - 8.

Choice C is incorrect. This is the value of $f1$, rather than $f7$.

Choice D is incorrect. This is the value of f-7, rather than $f7$.

Question Difficulty: Medium

Question ID a827de8e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: a827de8e

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: a827de8e Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that t represents the number of monthly deposits. In the given function $ft = 100 + 25t$, the coefficient of t is 25. This means that for every increase in the value of t by 1, the value of ft 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: Medium

Question ID 9d00ff8c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 9d00ff8c

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: 9d00ff8c 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.

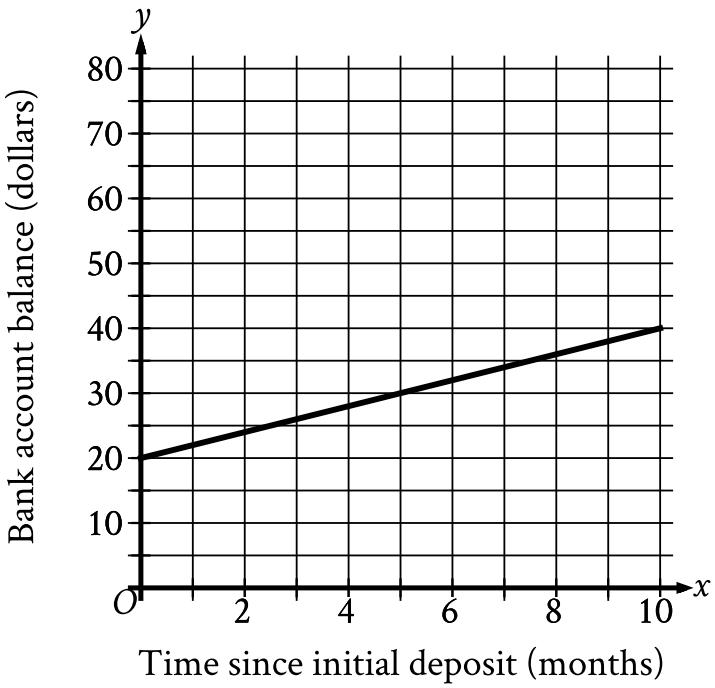
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 45bd797b

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 45bd797b



A bank account was opened with an initial deposit. Over the next several months, regular deposits were made into this account, and there were no withdrawals made during this time. The graph of the function f shown, where $y = f(x)$, estimates the account balance, in dollars, in this bank account x months since the initial deposit. To the nearest whole dollar, what is the amount of the initial deposit estimated by the graph?

ID: 45bd797b Answer

Correct Answer: 20

Rationale

The correct answer is 20. For the graph shown, the *x*-axis represents the time since the initial deposit, in months, and the *y*-axis represents the bank account balance, in dollars. The amount of the initial deposit is estimated by the *y*-coordinate of the point on the graph that represents 0 months since the initial deposit. Therefore, the amount of the initial deposit is estimated by the corresponding *y*-value for the point when $x = 0$. When $x = 0$, it is estimated that $y = 20$. Thus, the amount of the initial deposit estimated by the graph, to the nearest whole dollar, is 20.

Question Difficulty: Medium

Question ID 1e5aa7c5

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 1e5aa7c5

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: 1e5aa7c5 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 $fx = \frac{1}{10}x$ - 2. Substituting 0 for x in this equation yields $f0 = \frac{1}{10}0$ - 2, or $f0 =$ - 2. Since it's given that $y = fx$, it follows that $y =$ - 2 when $x = 0$. Therefore, the *y*-intercept of the graph of $y = fx$ 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: Medium

Question ID f0452309

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: f0452309

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

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: f0452309 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: Medium

Question ID 4b676fa9

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 4b676fa9

$$f(x) = x + b$$

For the linear function f, b is a constant. When $x = 0$, $f(x) = 30$. What is the value of b?

A. -30

B. $-\frac{1}{30}$

C. $\frac{1}{30}$

D. 30

ID: 4b676fa9 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that when $x = 0$, $fx = 30$. Substituting 0 for x and 30 for fx in the given function yields $30 = 0 + b$, or $30 = b$. Therefore, the value of b is 30.

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: Medium

Question ID bfd193f7

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: bfd193f7

A student council group is selling school posters for a fundraiser. They use the function $p(x) = 5x - 220$ to determine their profit $p(x)$, in dollars, for selling x school posters. In order to earn a profit of $\$900$, how many school posters must they sell?

ID: bfd193f7 Answer

Correct Answer: 224

Rationale

The correct answer is 224. It's given that a student council group uses the function $px = 5x$ - 220 to determine their profit px, in dollars, for selling x school posters. Substituting 900 for px in the given function yields $900 = 5x$ - 220. Adding 220 to each side of this equation yields $1{,}120 = 5x$. Dividing each side of this equation by 5 yields $224 = x$. Therefore, in order to earn a profit of $ 900, they must sell 224 school posters.

Question Difficulty: Medium

Question ID 0041a21e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 0041a21e

$$f(x) = x + \frac{8}{11}$$

The function f is defined by the given equation. What is the value of $f(x)$ when $x = \frac{3}{11}$?

ID: 0041a21e Answer

Correct Answer: 1

Rationale

The correct answer is 1. It's given that the function f is defined by $fx = x + \frac{8}{11}$. Substituting $\frac{3}{11}$ for x in the given function yields $f\frac{3}{11} = \frac{3}{11} + \frac{8}{11}$, which gives $f\frac{3}{11} = \frac{11}{11}$, or $f\frac{3}{11} = 1$. Therefore, when $x = \frac{3}{11}$, the value of fx is 1.

Question Difficulty: Medium

Question ID 7984ca2e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 7984ca2e

The function f is defined by $f(x) = -3x + 60$. What is the value of $f(x)$ when $x = -8$?

A. 49

B. 52

C. 57

D. 84

ID: 7984ca2e Answer

Correct Answer: D

Rationale

Choice D is correct. The value of fx when $x = -8$ can be found by substituting -8 for x in the given function. This yields $f-8 = -3-8 + 60$, or $f-8 = 84$. Therefore, when $x = -8$, the value of fx is 84.

Choice A is incorrect. This is the value of $-3 + -8 + 60$, not $-3-8 + 60$.

Choice B is incorrect. This is the value of $-8 + 60$, not $-3-8 + 60$.

Choice C is incorrect. This is the value of $-3 + 60$, not $-3-8 + 60$.

Question Difficulty: Medium

Question ID 355d8347

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 355d8347

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: 355d8347 Answer

Correct Answer: A

Rationale

Choice A is correct. An equation that defines a linear function f can be written in the form $fx = mx + b$, where m and b are constants. It's given in the table that when $x = 0$, $fx = 29$. Substituting 0 for x and 29 for fx in the equation $fx = mx + b$ yields $29 = m0 + b$, or $29 = b$. Substituting 29 for b in the equation $fx = mx + b$ yields $fx = mx + 29$. It's also given in the table that when $x = 1$, $fx = 32$. Substituting 1 for x and 32 for fx in the equation $fx = mx + 29$ yields $32 = m1 + 29$, or $32 = m + 29$. Subtracting 29 from both sides of this equation yields $3 = m$. Substituting 3 for m in the equation $fx = mx + 29$ yields $fx = 3x + 29$.

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: Medium

Question ID f20a49b1

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: f20a49b1

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

ID: f20a49b1 Answer

Correct Answer: 9

Rationale

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

Question Difficulty: Medium

Question ID 3535aecd

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 3535aecd

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: 3535aecd 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: Medium

Question ID a3e1df31

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: a3e1df31

$$f(x) = 8x + 4$$

The function f gives the estimated height, in feet, of a willow tree x years after its height was first measured. Which statement is the best interpretation of 4 in this context?

A. The tree will be measured each year for 4 years.

B. The tree is estimated to grow to a maximum height of 4 feet.

C. The estimated height of the tree increased by 4 feet each year.

D. The estimated height of the tree was 4 feet when it was first measured.

ID: a3e1df31 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the function $fx = 8x + 4$ gives the estimated height, in feet, of a willow tree x years after its height was first measured. For a function defined by an equation of the form $fx = mx + b$, where m and b are constants, b represents the value of fx when $x = 0$. It follows that in the given function, 4 represents the value of fx when $x = 0$. Therefore, the best interpretation of 4 in this context is that the estimated height of the tree was 4 feet when it was first measured.

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: Medium

Question ID 6069320c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 6069320c

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: 6069320c Answer

Correct Answer: B

Rationale

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

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

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

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

Question Difficulty: Medium

Question ID 88449695

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 88449695

As part of a science project on evaporation, Amaya measured the height of a liquid in a container over a period of time. The function $f(x) = 33 - 0.18x$ gives the estimated height, in centimeters (cm), of the liquid in the container x days after the start of the project. Which of the following is the best interpretation of 33 in this context?

A. The estimated height, in cm, of the liquid at the start of the project

B. The estimated height, in cm, of the liquid at the end of the project

C. The estimated change in the height, in cm, of the liquid each day

D. The estimated number of days for all of the liquid to evaporate

ID: 88449695 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the function $fx = 33$ - $0.18x$ gives the estimated height, in centimeters (cm), of the liquid in the container x days after the start of the project. For a linear function in the form $fx = a + bx$, where a and b are constants, a represents the value of $f0$ and b represents the rate of change of the function. It follows that in the given function, 33 represents the value of $f0$. Therefore, the best interpretation of 33 in this context is the estimated height, in cm, of the liquid at the start of the project.

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

Choice C is incorrect. The estimated change in the height, in cm, of the liquid each day is 0.18, not 33.

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

Question Difficulty: Medium

Question ID 0baa121f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 0baa121f

$$g(x) = 11x + 4$$

For the given linear function g, which table shows three values of x and their corresponding values of $g(x)$?

A.

x	$g(x)$
-1	7
0	11
1	15

B.

x	$g(x)$
-1	-4
0	0
1	4

C.

x	$g(x)$
-1	-7
0	4
1	15

D.

x	$g(x)$
-1	-11
0	0
1	11

ID: 0baa121f Answer

Correct Answer: C

Rationale

Choice C is correct. Each of the tables shows the same three values of x: -1, 0, and 1. Substituting -1 for x in the given function yields $g(-1) = 11(-1) + 4$, or $g\text{-}1 = -7$. Therefore, when $x = -1$, the corresponding value of $g(x)$ is -7. Substituting 0 for x in

the given function yields $g(0) = 11(0) + 4$, or $g(0) = 4$. Therefore, when $x = 0$, the corresponding value of $g(x)$ is 4. Substituting 1 for x in the given function yields $g(1) = 11(1) + 4$, or $g(1) = 15$. Therefore, when $x = 1$, the corresponding value of $g(x)$ is 15. The table in choice C shows -7, 4, and 15 as the corresponding value of $g(x)$ for *x*-values of -1, 0, and 1, respectively. Therefore, the table in choice C shows three values of x and their corresponding values of $g(x)$.

Choice A is incorrect. This table shows three values of x and their corresponding values of $g(x)$ for the linear function $g(x) = 4x + 11$.

Choice B is incorrect. This table shows three values of x and their corresponding values of $g(x)$ for the linear function $g(x) = 4x$.

Choice D is incorrect. This table shows three values of x and their corresponding values of $g(x)$ for the linear function $g(x) = 11x$.

Question Difficulty: Medium

Question ID 9e52bd8c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 9e52bd8c

Gabriella deposits $35 in a savings account at the end of each week. At the beginning of the 1st week of a year there was $600 in that savings account. How much money, in dollars, will be in the account at the end of the 4th week of that year?

A. 460

B. 635

C. 639

D. 740

ID: 9e52bd8c Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that at the beginning of the 1st week of the year there was $600 in a savings account and Gabriella deposits $35 in that savings account at the end of each week. Therefore, the amount of money, in dollars, in the savings account at the end of the 4th week of that year is $600 + 435$, or 740.

Choice A is incorrect. This is the amount of money, in dollars, that will be in the account at the end of the 4th week if Gabriella withdraws, rather than deposits, $35 at the end of each week.

Choice B is incorrect. This is the amount of money, in dollars, that will be in the account at the end of the 1st week, not the 4th week.

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

Question Difficulty: Medium

Question ID a87f0f51

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: a87f0f51

The function f defined by $f(t) = 14t + 9$ gives the estimated length, in inches, of a vine plant t months after Tavon purchased it. Which of the following is the best interpretation of 9 in this context?

A. Tavon will keep the vine plant for 9 months.

B. The vine plant is expected to grow 9 inches each month.

C. The vine plant is expected to grow to a maximum length of 9 inches.

D. The estimated length of the vine plant was 9 inches when Tavon purchased it.

ID: a87f0f51 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the function f defined by $ft = 14t + 9$ gives the estimated length, in inches, of a vine plant t months after Tavon purchased it. For a function defined by an equation of the form $ft = mt + b$, where m and b are constants, b represents the value of $f0$, or the value of ft when the value of t is 0. Therefore, for the function defined by $ft = 14t + 9$, 9 represents the value of ft when the value of t is 0. This means that 0 months after the vine plant was purchased, the estimated length of the vine plant was 9 inches. Therefore, the best interpretation of 9 in this context is the estimated length of the vine plant was 9 inches when Tavon purchased it.

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

Choice B is incorrect. The vine plant is expected to grow 14 inches, not 9 inches, each month.

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

Question Difficulty: Medium

Question ID 11cf758c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 11cf758c

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

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: 11cf758c 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 $f7 = 77 + 1$, or $f7 = 50$. Therefore, there are a total of 50 people on a company retreat with 7 managers.

Question Difficulty: Medium

Question ID 150bf0b1

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 150bf0b1

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: 150bf0b1 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that function f is defined by $fx = 80 - 6x$. The value of $f7$ can be found by substituting 7 for x in the given function, which yields $f7 = 80 - 67$, or $f7 = 80 - 42$, which is equivalent to $f7 = 38$. Therefore, the value of $f7$ is 38.

Choice A is incorrect. This is the value of $80 - 67$, not $80 - 67$.

Choice C is incorrect. This is the value of $80 - 61$, not $80 - 67$.

Choice D is incorrect. This is the value of $80 - 6 + 7$, not $80 - 67$.

Question Difficulty: Medium

Question ID 80bcab8e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 80bcab8e

For the linear function f, the graph of $y = f(x)$ in the *xy*-plane has a slope of 2 and has a *y*-intercept at $(0, -5)$. Which equation defines f?

A. $f(x) = \frac{1}{2}x - 5$

B. $f(x) = -\frac{1}{2}x - 5$

C. $f(x) = -2x - 5$

D. $f(x) = 2x - 5$

ID: 80bcab8e Answer

Correct Answer: D

Rationale

Choice D is correct. An equation defining the linear function f can be written in the form $fx = mx + b$, where m is the slope and $0, b$ is the *y*-intercept of the graph of $y = fx$ in the *xy*-plane. It's given that the graph of $y = fx$ has a slope of 2. Therefore, $m = 2$. It's also given that the graph of $y = fx$ has a *y*-intercept at $0,$ - 5. Therefore, $b =$ - 5. Substituting 2 for m and -5 for b in the equation $fx = mx + b$ yields $fx = 2x$ - 5. Thus, the equation that defines f is $fx = 2x$ - 5.

Choice A is incorrect. For this function, the graph of $y = fx$ in the *xy*-plane has a slope of $\frac{1}{2}$, not 2.

Choice B is incorrect. For this function, the graph of $y = fx$ in the *xy*-plane has a slope of -$\frac{1}{2}$, not 2.

Choice C is incorrect. For this function, the graph of $y = fx$ in the *xy*-plane has a slope of -2, not 2.

Question Difficulty: Medium

Question ID 12fecc78

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 12fecc78

For the linear function f, the graph of $y = f(x)$ in the *xy*-plane has a slope of $\frac{1}{4}$ and passes through the point $(0, 5)$. Which equation defines f?

A. $f(x) = \frac{1}{4}x + 5$

B. $f(x) = \frac{1}{4}x + \frac{1}{5}$

C. $f(x) = \frac{1}{4}x - \frac{5}{4}$

D. $f(x) = \frac{1}{4}x - 5$

ID: 12fecc78 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 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 linear function f, the graph of $y = f(x)$ in the *xy*-plane has a slope of $\frac{1}{4}$. Therefore, $m = \frac{1}{4}$. It's also given that the graph of $y = f(x)$ passes through the point $(0, 5)$. Therefore, the *y*-intercept of the graph is $(0, 5)$, and it follows that $b = 5$. Substituting $\frac{1}{4}$ for m and 5 for b in the equation $f(x) = mx + b$ yields $f(x) = \frac{1}{4}x + 5$.

Choice B is incorrect. This equation defines a function whose graph has a *y*-intercept of $(0, \frac{1}{5})$, not $(0, 5)$.

Choice C is incorrect. This equation defines a function whose graph has a *y*-intercept of $(0, -\frac{5}{4})$, not $(0, 5)$.

Choice D is incorrect. This equation defines a function whose graph has a *y*-intercept of $(0, -5)$, not $(0, 5)$.

Question Difficulty: Medium

Question ID 812d9507

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear functions	

ID: 812d9507

The function f is defined by $f(x) = 25x + 30$. What is the value of $f(x)$ when $x = 2$?

A. 50

B. 57

C. 80

D. 110

ID: 812d9507 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that the function f is defined by $fx = 25x + 30$. Substituting 2 for x in this equation yields $f2 = 252 + 30$, which is equivalent to $f2 = 50 + 30$, or $f2 = 80$. Therefore, the value of fx is 80 when $x = 2$.

Choice A is incorrect. This is the value of 252, not $252 + 30$.

Choice B is incorrect. This is the value of $25 + 2 + 30$, not $252 + 30$.

Choice D is incorrect. This is the value of $25 + 302$, not $252 + 30$.

Question Difficulty: Medium