

Question ID d9d67aa9

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: d9d67aa9

The y -intercept of the graph of $y = -6x - 32$ in the xy -plane is $(0, y)$. What is the value of y ?

ID: d9d67aa9 Answer

Correct Answer: -32

Rationale

The correct answer is -32 . It's given that the y -intercept of the graph of $y = -6x - 32$ is $(0, y)$. Substituting 0 for x in this equation yields $y = -6(0) - 32$, or $y = -32$. Therefore, the value of y that corresponds to the y -intercept of the graph of $y = -6x - 32$ in the xy -plane is -32 .

Question Difficulty: Medium

Question ID 1783bf90

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 1783bf90

A producer is creating a video with a length of **70** minutes. The video will consist of segments that are **1** minute long and segments that are **3** minutes long. Which equation represents this situation, where *x* represents the number of **1**-minute segments and *y* represents the number of **3**-minute segments?

- A. $4xy = 70$
- B. $4(x + y) = 70$
- C. $3x + y = 70$
- D. $x + 3y = 70$

ID: 1783bf90 Answer

Correct Answer: D

Rationale

Choice D is correct. Since *x* represents the number of **1**-minute segments and *y* represents the number of **3**-minute segments, the total length of the video is $1 \cdot x + 3 \cdot y$, or $x + 3y$, minutes. Since the video is **70** minutes long, the equation $x + 3y = 70$ represents this situation.

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 14aa7110

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 14aa7110

- A line in the xy -plane has a slope of $\frac{1}{9}$ and passes through the point $(0, 14)$. Which equation represents this line?
- A. $y = -\frac{1}{9}x - 14$
 - B. $y = -\frac{1}{9}x + 14$
 - C. $y = \frac{1}{9}x - 14$
 - D. $y = \frac{1}{9}x + 14$

ID: 14aa7110 Answer

Correct Answer: D

Rationale

Choice D is correct. The equation of a line in the xy -plane can be written as $y = mx + b$, where m represents the slope of the line and $(0, b)$ represents the y -intercept of the line. It's given that the slope of the line is $\frac{1}{9}$. It follows that $m = \frac{1}{9}$. It's also given that the line passes through the point $(0, 14)$. It follows that $b = 14$. Substituting $\frac{1}{9}$ for m and 14 for b in $y = mx + b$ yields $y = \frac{1}{9}x + 14$. Thus, the equation $y = \frac{1}{9}x + 14$ represents this line.

Choice A is incorrect. This equation represents a line with a slope of $-\frac{1}{9}$ and a y -intercept of $(0, -14)$.

Choice B is incorrect. This equation represents a line with a slope of $-\frac{1}{9}$ and a y -intercept of $(0, 14)$.

Choice C is incorrect. This equation represents a line with a slope of $\frac{1}{9}$ and a y -intercept of $(0, -14)$.

Question Difficulty: Medium

Question ID 4580a0d2

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 4580a0d2

A machine makes large boxes or small boxes, one at a time, for a total of **700** minutes each day. It takes the machine **10** minutes to make a large box or **5** minutes to make a small box. Which equation represents the possible number of large boxes, x , and small boxes, y , the machine can make each day?

- A. $5x + 10y = 700$
- B. $10x + 5y = 700$
- C. $(x + y)(10 + 5) = 700$
- D. $(10 + x)(5 + y) = 700$

ID: 4580a0d2 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that it takes the machine **10** minutes to make a large box. It's also given that x represents the possible number of large boxes the machine can make each day. Multiplying **10** by x gives $10x$, which represents the amount of time spent making large boxes. It's given that it takes the machine **5** minutes to make a small box. It's also given that y represents the possible number of small boxes the machine can make each day. Multiplying **5** by y gives $5y$, which represents the amount of time spent making small boxes. Combining the amount of time spent making x large boxes and y small boxes yields $10x + 5y$. It's given that the machine makes boxes for a total of **700** minutes each day. Therefore $10x + 5y = 700$ represents the possible number of large boxes, x , and small boxes, y , the machine can make each day.

Choice A is incorrect and may result from associating the time of **10** minutes with small, rather than large, boxes and the time of **5** minutes with large, rather than small, boxes.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID e37853d7

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: e37853d7

In **2010**, a swim club had a total of **35** swimmers, each classified as either advanced or intermediate. From **2010** to **2020**, the number of advanced swimmers in the club increased by approximately **53%**, and the number of intermediate swimmers in the club increased by approximately **44%**. The total number of swimmers in the club increased by approximately **49%**. Which equation best represents this situation, where ***a*** represents the number of advanced swimmers in the club in **2010** and ***b*** represents the number of intermediate swimmers in the club in **2010**?

- A. $1.53a + 1.49b = 35(1.44)$
- B. $1.49a + 0.53b = 35(1.44)$
- C. $1.53a + 1.44b = 35(1.49)$
- D. $1.44a + 1.53b = 35(1.49)$

ID: e37853d7 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that in **2010**, a swim club had a total of **35** swimmers, each classified as either advanced or intermediate, and that ***a*** represents the number of advanced swimmers in **2010** and ***b*** represents the number of intermediate swimmers in **2010**. It's also given that from **2010** to **2020**, the number of advanced swimmers in the club increased by approximately **53%** and the number of intermediate swimmers in the club increased by approximately **44%**. Thus, in **2020**, the approximate number of advanced swimmers in the club can be represented as **$1.53a$** and the approximate number of intermediate swimmers in the club can be represented as **$1.44b$** . It's given that the total number of swimmers in the club increased by approximately **49%** from **2010** to **2020**. Since the club had **35** swimmers in **2010**, it follows that the total number of swimmers in **2020** can be represented as **$35(1.49)$** . Since the sum of the number of advanced swimmers in **2020** and the number of intermediate swimmers in **2020** equals the total number of swimmers in **2020**, the equation **$1.53a + 1.44b = 35(1.49)$** best represents this situation.

Choice A is incorrect. This equation represents a situation where the number of intermediate swimmers in the club in **2020** increased by approximately **49%**, not **44%**, and the total number of swimmers in the club in **2020** increased by approximately **44%**, not **49%**.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect. This equation represents a situation where the number of advanced swimmers in the club in **2020** increased by approximately **44%**, not **53%**, and the number of intermediate swimmers in the club in **2020** increased by approximately **53%**, not **44%**.

Question Difficulty: Medium

Question ID 46790b75

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 46790b75

A chemist studying the impact of salt on a process mixes x kilograms of a low-salt mixture, which is 2% salt by weight, with y kilograms of a high-salt mixture, which is 96% salt by weight, to create 24 kilograms of a mixture that is 4% salt by weight. Which equation represents this situation?

- A. $0.96x + 0.02y = (0.04)(24)$
- B. $0.02x + 0.96y = (0.04)(24)$
- C. $0.96x + 0.02y = 24$
- D. $0.02x + 0.96y = 24$

ID: 46790b75 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that a chemist mixes x kilograms of a low-salt mixture, which is 2% salt by weight. Multiplying 0.02 by the amount of the low-salt mixture, x kilograms, yields $0.02x$ kilograms of salt in the low-salt mixture. It's also given that the chemist mixes y kilograms of a high-salt mixture, which is 96% salt by weight. Multiplying 0.96 by the amount of the high-salt mixture, y kilograms, yields $0.96y$ kilograms of salt in the high-salt mixture. Therefore, the total amount of salt in the combined mixture is $0.02x + 0.96y$ kilograms. It's given that the low-salt mixture and the high-salt mixture together create 24 kilograms of a combined mixture that is 4% salt by weight. Thus, the amount of salt in the combined mixture is $0.04(24)$ kilograms. Since the total amount of salt in the combined mixture equals the amount of salt in the low-salt mixture and the amount of salt in the high-salt mixture, the equation $0.02x + 0.96y = (0.04)(24)$ represents this situation.

Choice A is incorrect. This equation represents a situation where the low-salt mixture is 96%, not 2%, salt by weight and the high-salt mixture is 2%, not 96%, salt by weight.

Choice C is incorrect. This equation represents a situation where the low-salt mixture is 96%, not 2%, salt by weight and the high-salt mixture is 2%, not 96%, salt by weight, and where the combined mixture contains 24 kilograms of salt, not 24 kilograms of a mixture that is 4% salt by weight.

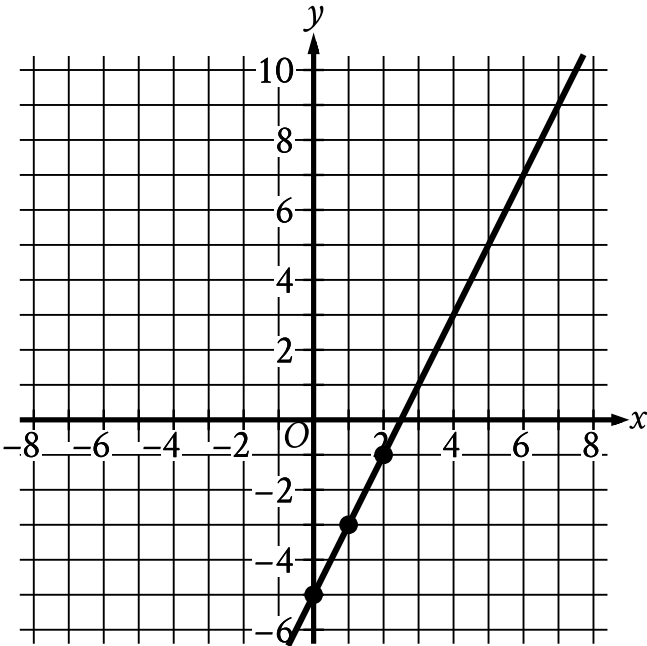
Choice D is incorrect. This equation represents a situation where the combined mixture contains 24 kilograms of salt, not 24 kilograms of a mixture that is 4% salt by weight.

Question Difficulty: Medium

Question ID b58d65ae

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: b58d65ae



The graph shows the linear relationship between x and y . Which table gives three values of x and their corresponding values of y for this relationship?

A.

x	y
0	0
1	-7
2	-9

B.

x	y
0	0
1	-3
2	-1

C.

x	y
0	-5
1	-7

2	−9
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D.

x	y
0	−5
1	−3
2	−1

ID: b58d65ae Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the graph shows the linear relationship between x and y . The given graph passes through the points $(0, -5)$, $(1, -3)$, and $(2, -1)$. It follows that when $x = 0$, the corresponding value of y is -5 , when $x = 1$, the corresponding value of y is -3 , and when $x = 2$, the corresponding value of y is -1 . Of the given choices, only the table in choice D gives these three values of x and their corresponding values of y for the relationship shown in the graph.

Choice A is incorrect. This table represents a relationship between x and y such that the graph passes through the points $(0, 0)$, $(1, -7)$, and $(2, -9)$.

Choice B is incorrect. This table represents a relationship between x and y such that the graph passes through the points $(0, 0)$, $(1, -3)$, and $(2, -1)$.

Choice C is incorrect. This table represents a linear relationship between x and y such that the graph passes through the points $(0, -5)$, $(1, -7)$, and $(2, -9)$.

Question Difficulty: Medium

Question ID 791f1069

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 791f1069

What is the y-intercept of the graph of $y = 34x + 81$ in the xy-plane?

- A. $(0, 81)$
- B. $(0, 34)$
- C. $(0, -34)$
- D. $(0, -81)$

ID: 791f1069 Answer

Correct Answer: A

Rationale

Choice A is correct. In the xy-plane, the graph of an equation in the form $y = mx + b$, where m and b are constants, has a slope of m and a y-intercept of $(0, b)$. Therefore, the y-intercept of the graph of $y = 34x + 81$ is $(0, 81)$.

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 e274b554

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: e274b554

Line r in the xy -plane has a slope of 4 and passes through the point $(0, 6)$. Which equation defines line r ?

- A. $y = -6x + 4$
- B. $y = 6x + 4$
- C. $y = 4x - 6$
- D. $y = 4x + 6$

ID: e274b554 Answer

Correct Answer: D

Rationale

Choice D is correct. A line in the xy -plane with a slope of m and a y -intercept of $(0, b)$ can be defined by an equation in the form $y = mx + b$. It's given that line r has a slope of 4 and passes through the point $(0, 6)$. It follows that $m = 4$ and $b = 6$. Substituting 4 for m and 6 for b in the equation $y = mx + b$ yields $y = 4x + 6$. Therefore, the equation $y = 4x + 6$ defines line r .

Choice A is incorrect. This equation defines a line that has a slope of -6 , not 4 , and passes through the point $(0, 4)$, not $(0, 6)$.

Choice B is incorrect. This equation defines a line that has a slope of 6 , not 4 , and passes through the point $(0, 4)$, not $(0, 6)$.

Choice C is incorrect. This equation defines a line that passes through the point $(0, -6)$, not $(0, 6)$.

Question Difficulty: Medium

Question ID 2c7305e5

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 2c7305e5

A store sells two different-sized containers of a certain Greek yogurt. The store’s sales of this Greek yogurt totaled **1,277.94** dollars last month. The equation **$5.48x + 7.30y = 1,277.94$** represents this situation, where **x** is the number of smaller containers sold and **y** is the number of larger containers sold. According to the equation, which of the following represents the price, in dollars, of each smaller container?

- A. **5.48**
- B. **$7.30y$**
- C. **7.30**
- D. **$5.48x$**

ID: 2c7305e5 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the store's sales of a certain Greek yogurt totaled **1,277.94** dollars last month. It's also given that the equation **$5.48x + 7.30y = 1,277.94$** represents this situation, where **x** is the number of smaller containers sold and **y** is the number of larger containers sold. Since **x** represents the number of smaller containers of yogurt sold, the expression **$5.48x$** represents the total sales, in dollars, from smaller containers of yogurt. This means that **x** smaller containers of yogurt were sold at a price of **5.48** dollars each. Therefore, according to the equation, **5.48** represents the price, in dollars, of each smaller container.

Choice B is incorrect. This expression represents the total sales, in dollars, from selling **y** larger containers of yogurt.

Choice C is incorrect. This value represents the price, in dollars, of each larger container of yogurt.

Choice D is incorrect. This expression represents the total sales, in dollars, from selling **x** smaller containers of yogurt.

Question Difficulty: Medium

Question ID 48122a42

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 48122a42

Line k is defined by $y = \frac{1}{4}x + 1$. Line j is parallel to line k in the xy -plane. What is the slope of j ?

ID: 48122a42 Answer

Correct Answer: .25, 1/4

Rationale

The correct answer is $\frac{1}{4}$. It's given that line k is defined by $y = \frac{1}{4}x + 1$. It's also given that line j is parallel to line k in the xy -plane. A line in the xy -plane represented by an equation in slope-intercept form $y = mx + b$ has a slope of m and a y -intercept of $(0, b)$. Therefore, the slope of line k is $\frac{1}{4}$. Since parallel lines have equal slopes, the slope of line j is $\frac{1}{4}$. Note that 1/4 and .25 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID a60e071e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: a60e071e

$y = 70x + 8$

Which table gives three values of x and their corresponding values of y for the given equation?

A.

x	y
0	8
2	148
4	288

B.

x	y
0	70
2	78
4	86

C.

x	y
0	70
2	140
4	280

D.

x	y
0	8
2	132
4	272

ID: a60e071e Answer

Correct Answer: A

Rationale

Choice A is correct. Each of the given choices gives three values of x : **0**, **2**, and **4**. Substituting **0** for x in the given equation yields $y = 70(0) + 8$, or $y = 8$. Therefore, when $x = 0$, the corresponding value of y for the given equation is **8**. Substituting **2** for x in the given equation yields $y = 70(2) + 8$, or $y = 148$. Therefore, when $x = 2$, the

corresponding value of y for the given equation is **148**. Substituting **4** for x in the given equation yields $y = 70(4) + 8$, or $y = 288$. Therefore, when $x = 4$, the corresponding value of y for the given equation is **288**. Thus, if the three values of x are **0, 2, and 4**, then their corresponding values of y are **8, 148, and 288**, respectively, for the given equation.

Choice B is incorrect. This table gives three values of x and their corresponding values of y for the equation $y = 4x + 70$.

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 77a00e0f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 77a00e0f

The equation $46 = 2a + 2b$ gives the relationship between the side lengths a and b of a certain parallelogram. If $a = 9$, what is the value of b ?

ID: 77a00e0f Answer

Correct Answer: 14

Rationale

The correct answer is **14**. It's given that the equation $46 = 2a + 2b$ gives the relationship between the side lengths a and b of a certain parallelogram. Substituting **9** for a in the given equation yields $46 = 2(9) + 2b$, or $46 = 18 + 2b$. Subtracting **18** from both sides of this equation yields $28 = 2b$. Dividing both sides of this equation by **2** yields $14 = b$. Therefore, if $a = 9$, the value of b is **14**.

Question Difficulty: Medium

Question ID a2579a71

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: a2579a71

The equation $x + y = 1,440$ represents the number of minutes of daylight (between sunrise and sunset), x , and the number of minutes of non-daylight, y , on a particular day in Oak Park, Illinois. If this day has **670** minutes of daylight, how many minutes of non-daylight does it have?

- A. **670**
- B. **770**
- C. **1,373**
- D. **1,440**

ID: a2579a71 Answer

Correct Answer: B

Rationale

Choice B is correct. It’s given that the equation $x + y = 1,440$ represents the number of minutes of daylight, x , and the number of minutes of non-daylight, y , on a particular day in Oak Park, Illinois. It’s also given that this day has **670** minutes of daylight. Substituting **670** for x in the equation $x + y = 1,440$ yields $670 + y = 1,440$. Subtracting **670** from both sides of this equation yields $y = 770$. Therefore, this day has **770** minutes of non-daylight.

Choice A is incorrect. This is the number of minutes of daylight, not non-daylight, on this day.

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

Choice D is incorrect. This is the total number of minutes of daylight and non-daylight.

Question Difficulty: Medium

Question ID 701e0600

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 701e0600

$y = -4x + 40$

Which table gives three values of x and their corresponding values of y for the given equation?

A.

x	y
0	0
1	-4
2	-8

B.

x	y
0	40
1	44
2	48

C.

x	y
0	40
1	36
2	32

D.

x	y
0	0
1	4
2	8

ID: 701e0600 Answer

Correct Answer: C

Rationale

Choice C is correct. Each of the given choices gives three values of x : 0, 1, and 2. Substituting 0 for x in the given equation yields $y = -4(0) + 40$, or $y = 40$. Therefore, when $x = 0$, the corresponding value of y for the given equation is 40. Substituting 1 for x in the given equation yields $y = -4(1) + 40$, or $y = 36$. Therefore, when $x = 1$, the

corresponding value of y for the given equation is **36**. Substituting **2** for x in the given equation yields $y = -4(2) + 40$, or $y = 32$. Therefore, when $x = 2$, the corresponding value of y for the given equation is **32**. Choice C gives three values of x , **0**, **1**, and **2**, and their corresponding values of y , **40**, **36**, and **32**, respectively, for the given equation.

Choice A is incorrect. This table gives three values of x and their corresponding values of y for the equation $y = -4x$.

Choice B is incorrect. This table gives three values of x and their corresponding values of y for the equation $y = 4x + 40$.

Choice D is incorrect. This table gives three values of x and their corresponding values of y for the equation $y = 4x$.

Question Difficulty: Medium

Question ID 00d0224c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 00d0224c

A food truck buys forks for ~~\$0.04~~ each and plates for ~~\$0.48~~ each. The total cost of x forks and y plates is ~~\$661.76~~. Which equation represents this situation?

- A. $0.48x - 0.04y = 661.76$
- B. $0.04x - 0.48y = 661.76$
- C. $0.48x + 0.04y = 661.76$
- D. $0.04x + 0.48y = 661.76$

ID: 00d0224c Answer

Correct Answer: D

Rationale

Choice D is correct. It’s given that the food truck buys forks for ~~\$0.04~~ each. Therefore, the cost, in dollars, of x forks can be represented by the expression $0.04x$. It’s also given that the food truck buys plates for ~~\$0.48~~ each. Therefore, the cost, in dollars, of y plates can be represented by the expression $0.48y$. Since the total cost of x forks and y plates is ~~\$661.76~~, the equation $0.04x + 0.48y = 661.76$ represents this situation.

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

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

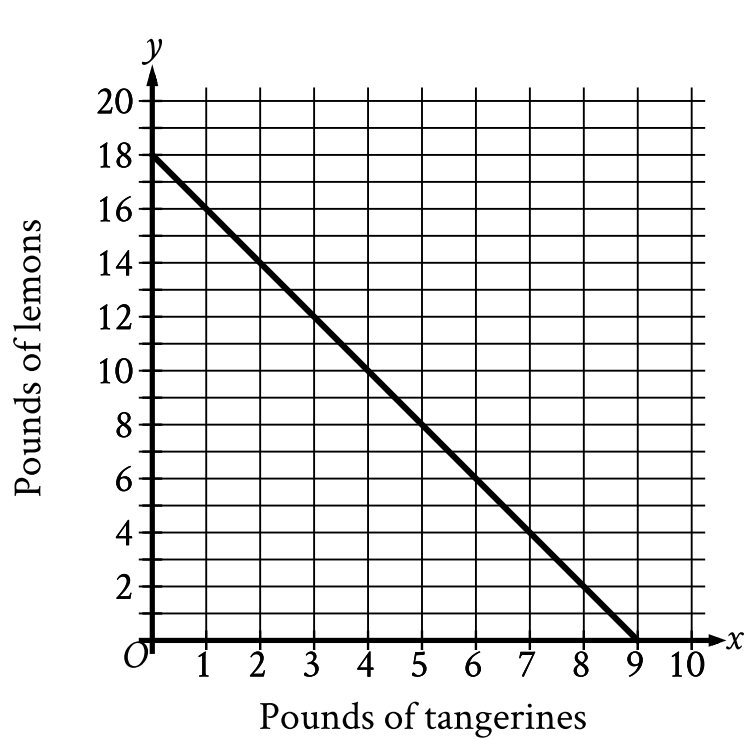
Choice C is incorrect. This equation represents a situation in which the food truck buys forks for ~~\$0.48~~ each and plates for ~~\$0.04~~ each.

Question Difficulty: Medium

Question ID 6d5fdc9e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 6d5fdc9e



The graph shows the possible combinations of the number of pounds of tangerines and lemons that could be purchased for \$18 at a certain store. If Melvin purchased lemons and 4 pounds of tangerines for a total of \$18, how many pounds of lemons did he purchase?

- A. 7
- B. 10
- C. 14
- D. 16

ID: 6d5fdc9e Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the graph shows the possible combinations of the number of pounds of tangerines, x , and the number of pounds of lemons, y , that could be purchased for \$18 at a certain store. If Melvin purchased lemons and 4 pounds of tangerines for a total of \$18, the number of pounds of lemons he purchased is represented by the y -coordinate of the point on the graph where $x = 4$. For the graph shown, when $x = 4$, $y = 10$. Therefore, if Melvin purchased lemons and 4 pounds of tangerines for a total of \$18, then he purchased 10 pounds of lemons.

Choice A is incorrect. This is the number of pounds of tangerines Melvin purchased if he purchased tangerines and 4 pounds of lemons for a total of \$18.

Choice C is incorrect. This is the number of pounds of lemons Melvin purchased if he purchased lemons and **2** pounds of tangerines for a total of **\$18**.

Choice D is incorrect. This is the number of pounds of lemons Melvin purchased if he purchased lemons and **1** pound of tangerines for a total of **\$18**.

Question Difficulty: Medium

Question ID ac09437c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: ac09437c

The equation $46 = 2x + 2y$ gives the perimeter of a rectangular rug that has length x , in feet, and width y , in feet. The width of the rug is 8 feet. What is the length, in feet, of the rug?

ID: ac09437c Answer

Correct Answer: 15

Rationale

The correct answer is 15. It's given that the equation $46 = 2x + 2y$ gives the perimeter of a rectangular rug that has length x , in feet, and width y , in feet. It's also given that the width of the rug is 8 feet. Substituting 8 for y in the equation $46 = 2x + 2y$ yields $46 = 2x + 2(8)$, or $46 = 2x + 16$. Subtracting 16 from both sides of this equation yields $30 = 2x$. Dividing both sides of this equation by 2 yields $15 = x$. Since x represents the length, in feet, of the rug, it follows that the length of the rug is 15 feet.

Question Difficulty: Medium

Question ID b2fbbed2

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: b2fbbed2

Davio bought some potatoes and celery. The potatoes cost **\$0.69** per pound, and the celery cost **\$0.99** per pound. If Davio spent **\$5.34** in total and bought twice as many pounds of celery as pounds of potatoes, how many pounds of celery did Davio buy?

- A. **2**
- B. **2.5**
- C. **2.67**
- D. **4**

ID: b2fbbed2 Answer

Correct Answer: D

Rationale

Choice D is correct. Let ***p*** represent the number of pounds of potatoes and let ***c*** represent the number of pounds of celery that Davio bought. It's given that potatoes cost **\$0.69** per pound and celery costs **\$0.99** per pound. If Davio spent **\$5.34** in total, then the equation **$0.69p + 0.99c = 5.34$** represents this situation. It's also given that Davio bought twice as many pounds of celery as pounds of potatoes; therefore, **$c = 2p$** . Substituting **$2p$** for ***c*** in the equation **$0.69p + 0.99c = 5.34$** yields **$0.69p + 0.99(2p) = 5.34$** , which is equivalent to **$0.69p + 1.98p = 5.34$** , or **$2.67p = 5.34$** . Dividing both sides of this equation by **2.67** yields **$p = 2$** . Substituting **2** for ***p*** in the equation **$c = 2p$** yields **$c = 2(2)$** , or **$c = 4$** . Therefore, Davio bought **4** pounds of celery.

Choice A is incorrect. This is the number of pounds of potatoes, not the number of pounds of celery, Davio bought.

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 b83edf94

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: b83edf94

Line k is defined by $y = 3x + 15$. Line j is perpendicular to line k in the xy -plane. What is the slope of line j ?

- A. $-\frac{1}{3}$
- B. $-\frac{1}{12}$
- C. $-\frac{1}{18}$
- D. $-\frac{1}{45}$

ID: b83edf94 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that line j is perpendicular to line k in the xy -plane. It follows that the slope of line j is the opposite reciprocal of the slope of line k . The equation for line k is written in slope-intercept form $y = mx + b$, where m is the slope of the line and b is the y -coordinate of the y -intercept of the line. It follows that the slope of line k is 3 . The opposite reciprocal of a number is -1 divided by the number. Thus, the opposite reciprocal of 3 is $-\frac{1}{3}$. Therefore, the slope of line j is $-\frac{1}{3}$.

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 cd59678b

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: cd59678b

A teacher is creating an assignment worth **70** points. The assignment will consist of questions worth **1** point and questions worth **3** points. Which equation represents this situation, where x represents the number of **1**-point questions and y represents the number of **3**-point questions?

- A. $4xy = 70$
- B. $4(x + y) = 70$
- C. $3x + y = 70$
- D. $x + 3y = 70$

ID: cd59678b Answer

Correct Answer: D

Rationale

Choice D is correct. Since x represents the number of **1**-point questions and y represents the number of **3**-point questions, the assignment is worth a total of $1 \cdot x + 3 \cdot y$, or $x + 3y$, points. Since the assignment is worth **70** points, the equation $x + 3y = 70$ represents this situation.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

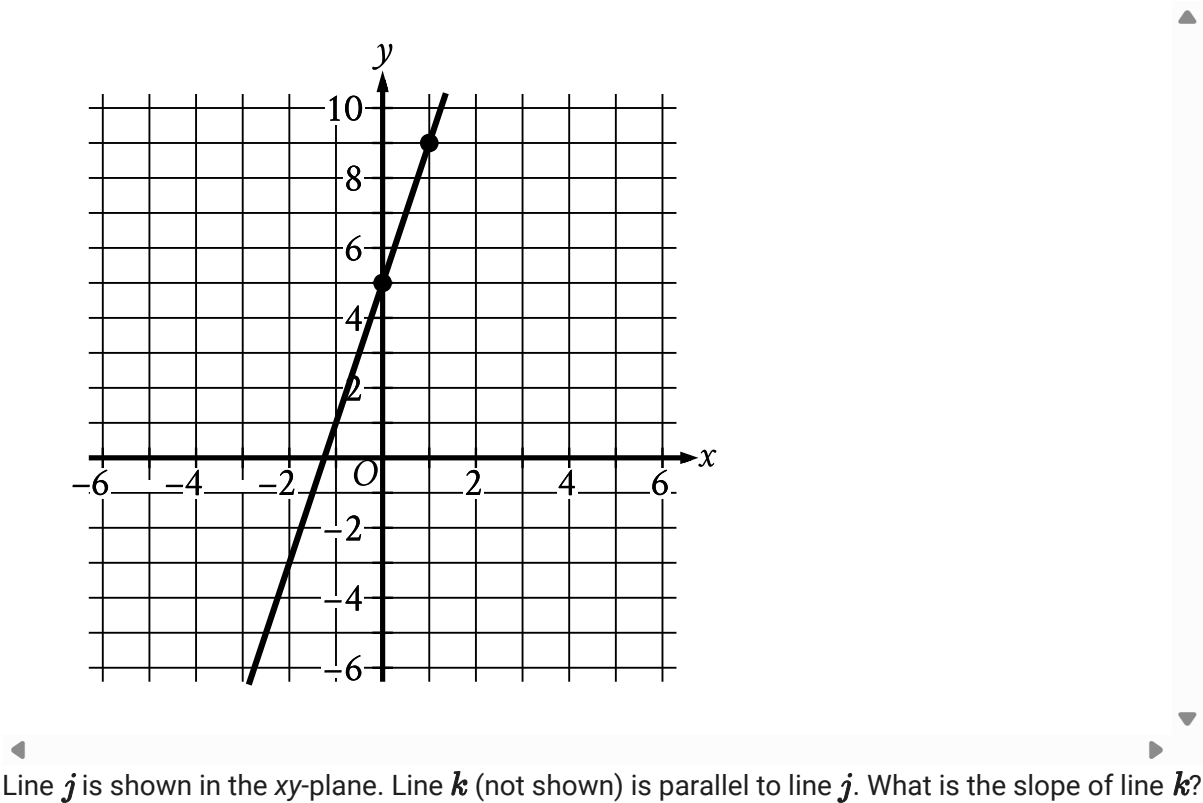
Choice C is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID b90aad30

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: b90aad30



Line j is shown in the xy -plane. Line k (not shown) is parallel to line j . What is the slope of line k ?

ID: b90aad30 Answer

Correct Answer: 4

Rationale

The correct answer is **4**. It's given that line k is parallel to line j . It follows that the slope of line k is equal to the slope of line j . Given two points on a line in the xy -plane, (x_1, y_1) and (x_2, y_2) , the slope of the line can be calculated as $\frac{y_2 - y_1}{x_2 - x_1}$. In the xy -plane shown, the points $(0, 5)$ and $(1, 9)$ are on line j . It follows that the slope of line j is $\frac{9 - 5}{1 - 0}$, or **4**. Since the slope of line j is equal to the slope of line k , the slope of line k is also **4**.

Question Difficulty: Medium

Question ID d1b7b897

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: d1b7b897

Last week, an interior designer earned a total of \$1,258 from consulting for x hours and drawing up plans for y hours. The equation $68x + 85y = 1,258$ represents this situation. Which of the following is the best interpretation of 68 in this context?

- A. The interior designer earned \$68 per hour consulting last week.
- B. The interior designer worked 68 hours drawing up plans last week.
- C. The interior designer earned \$68 per hour drawing up plans last week.
- D. The interior designer worked 68 hours consulting last week.

ID: d1b7b897 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that $68x + 85y = 1,258$ represents the situation where an interior designer earned a total of \$1,258 last week from consulting for x hours and drawing up plans for y hours. Thus, $68x$ represents the amount earned, in dollars, from consulting for x hours, and $85y$ represents the amount earned, in dollars, from drawing up plans for y hours. Since $68x$ represents the amount earned, in dollars, from consulting for x hours, it follows that the interior designer earned \$68 per hour consulting last week.

Choice B is incorrect. The interior designer worked y hours, not 68 hours, drawing up plans last week.

Choice C is incorrect. The interior designer earned \$85 per hour, not \$68 per hour, drawing up plans last week.

Choice D is incorrect. The interior designer worked x hours, not 68 hours, consulting last week.

Question Difficulty: Medium

Question ID 908625ad

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 908625ad

Jay walks at a speed of **3** miles per hour and runs at a speed of **5** miles per hour. He walks for *w* hours and runs for *r* hours for a combined total of **14** miles. Which equation represents this situation?

- A. $3w + 5r = 14$
- B. $\frac{1}{3}w + \frac{1}{5}r = 14$
- C. $\frac{1}{3}w + \frac{1}{5}r = 112$
- D. $3w + 5r = 112$

ID: 908625ad Answer

Correct Answer: A

Rationale

Choice A is correct. Since Jay walks at a speed of **3** miles per hour for *w* hours, Jay walks a total of **3w** miles. Since Jay runs at a speed of **5** miles per hour for *r* hours, Jay runs a total of **5r** miles. Therefore, the total number of miles Jay travels can be represented by **3w + 5r**. Since the combined total number of miles is **14**, the equation **3w + 5r = 14** represents this situation.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID bfad9db1

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: bfad9db1

For a camping trip a group bought x one-liter bottles of water and y three-liter bottles of water, for a total of **240** liters of water. Which equation represents this situation?

- A. $x + 3y = 240$
- B. $x + y = 240$
- C. $3x + 3y = 240$
- D. $3x + y = 240$

ID: bfad9db1 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that for a camping trip a group bought x one-liter bottles of water and y three-liter bottles of water. Since the group bought x one-liter bottles of water, the total number of liters bought from x one-liter bottles of water is represented as **1** x , or x . Since the group bought y three-liter bottles of water, the total number of liters bought from y three-liter bottles of water is represented as **3** y . It's given that the group bought a total of **240** liters; thus, the equation $x + 3y = 240$ represents this situation.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect. This equation represents a situation where the group bought x three-liter bottles of water and y one-liter bottles of water, for a total of **240** liters of water.

Question Difficulty: Medium

Question ID 1d833593

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 1d833593

Naomi bought both rabbit snails and nerite snails for a total of \$52. Each rabbit snail costs \$8 and each nerite snail costs \$6. If Naomi bought 2 nerite snails, how many rabbit snails did she buy?

- A. 5
- B. 12
- C. 14
- D. 50

ID: 1d833593 Answer

Correct Answer: A

Rationale

Choice A is correct. Let x represent the number of rabbit snails that Naomi bought. It's given that each rabbit snail costs \$8. Therefore, the total cost, in dollars, of the rabbit snails that Naomi bought can be represented by the expression $8x$. It's also given that each nerite snail costs \$6, and that Naomi bought 2 nerite snails. Therefore, the total cost, in dollars, of the nerite snails that Naomi bought is $6(2)$, or 12. Since Naomi bought both the rabbit snails and the nerite snails for a total of \$52, the equation $8x + 12 = 52$ can be used to represent the situation. Subtracting 12 from both sides of this equation yields $8x = 40$. Dividing both sides of this equation by 8 yields $x = 5$. Therefore, Naomi bought 5 rabbit snails.

Choice B is incorrect. This is the total cost, in dollars, of the nerite snails that Naomi bought, not the number of rabbit snails.

Choice C is incorrect. This is the cost, in dollars, of one rabbit snail and one nerite snail, not the number of rabbit snails that Naomi bought.

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

Question Difficulty: Medium

Question ID 809c054a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 809c054a

$7x - 4y = -84$

For the given equation, which table gives three values of x and their corresponding values of y ?

A.

x	0	4	8
y	21	28	35

B.

x	0	4	8
y	35	28	21

C.

x	21	28	35
y	0	4	8

D.

x	21	28	35
y	8	4	0

ID: 809c054a Answer

Correct Answer: A

Rationale

Choice A is correct. To verify which table represents this linear relationship, the values in each table can be checked by substituting them into the given equation. The table in choice A shows that when $x = 0, y = 21$. Substituting these values into the given equation yields $7(0) - 4(21) = -84$, or $-84 = -84$, which is true. Additionally, the table in choice A shows that when $x = 4, y = 28$. Substituting these values into the given equation yields $7(4) - 4(28) = -84$, or $-84 = -84$, which is true. Finally, the table in choice A shows that when $x = 8, y = 35$. Substituting these values into the given equation yields $7(8) - 4(35) = -84$, or $-84 = -84$, which is true. Therefore, the table in choice A gives three values of x and their corresponding values of y .

Choice B is incorrect. The table in choice B shows that when $x = 0, y = 35$. Substituting these values into the given equation yields $7(0) - 4(35) = -84$, or $-140 = -84$, which is not true.

Choice C is incorrect. The table in choice C shows that when $x = 21, y = 0$. Substituting these values into the given equation yields $7(21) - 4(0) = -84$, or $147 = -84$, which is not true.

Choice D is incorrect. The table in choice D shows that when $x = 21, y = 8$. Substituting these values into the given equation yields $7(21) - 4(8) = -84$, or $115 = -84$, which is not true.

Question ID 5eab935f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 5eab935f

The y-intercept of the graph of $12x + 2y = 18$ in the xy-plane is $(0, y)$. What is the value of y ?

ID: 5eab935f Answer

Correct Answer: 9

Rationale

The correct answer is **9**. It's given that the y-intercept of the graph of $12x + 2y = 18$ in the xy-plane is $(0, y)$. Substituting **0** for x in the equation $12x + 2y = 18$ yields $12(0) + 2y = 18$, or $2y = 18$. Dividing both sides of this equation by **2** yields $y = 9$. Therefore, the value of y is **9**.

Question Difficulty: Medium

Question ID 52c1d2f8

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 52c1d2f8

Vivian bought party hats and cupcakes for **\$71**. Each package of party hats cost **\$3**, and each cupcake cost **\$1**. If Vivian bought **10** packages of party hats, how many cupcakes did she buy?

ID: 52c1d2f8 Answer

Correct Answer: 41

Rationale

The correct answer is **41**. The number of cupcakes Vivian bought can be found by first finding the amount Vivian spent on cupcakes. The amount Vivian spent on cupcakes can be found by subtracting the amount Vivian spent on party hats from the total amount Vivian spent. The amount Vivian spent on party hats can be found by multiplying the cost per package of party hats by the number of packages of party hats, which yields **$\$3 \cdot 10$** , or **\$30**. Subtracting the amount Vivian spent on party hats, **\$30**, from the total amount Vivian spent, **\$71**, yields **$\$71 - \$30$** , or **\$41**. Since the amount Vivian spent on cupcakes was **\$41** and each cupcake cost **\$1**, it follows that Vivian bought **41** cupcakes.

Question Difficulty: Medium

Question ID 78dc6178

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 78dc6178

The equation $40x + 20y = 160$ represents the number of sweaters, x , and number of shirts, y , that Yesenia purchased for \$160. If Yesenia purchased 2 sweaters, how many shirts did she purchase?

- A. 3
- B. 4
- C. 8
- D. 40

ID: 78dc6178 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the equation $40x + 20y = 160$ represents the number of sweaters, x , and the number of shirts, y , that Yesenia purchased for \$160. If Yesenia purchased 2 sweaters, the number of shirts she purchased can be calculated by substituting 2 for x in the given equation, which yields $40(2) + 20y = 160$, or $80 + 20y = 160$. Subtracting 80 from both sides of this equation yields $20y = 80$. Dividing both sides of this equation by 20 yields $y = 4$. Therefore, if Yesenia purchased 2 sweaters, she purchased 4 shirts.

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

Choice C is incorrect. This is the number of shirts Yesenia purchased if she purchased 0 sweaters.

Choice D is incorrect. This is the price, in dollars, for each sweater, not the number of shirts Yesenia purchased.

Question Difficulty: Medium

Question ID 3c3e33bf

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 3c3e33bf

A total of **364** paper straws of equal length were used to construct two types of polygons: triangles and rectangles. The triangles and rectangles were constructed so that no two polygons had a common side. The equation $3x + 4y = 364$ represents this situation, where x is the number of triangles constructed and y is the number of rectangles constructed. What is the best interpretation of $(x, y) = (24, 73)$ in this context?

- A. If **24** triangles were constructed, then **73** rectangles were constructed.
- B. If **24** triangles were constructed, then **73** paper straws were used.
- C. If **73** triangles were constructed, then **24** rectangles were constructed.
- D. If **73** triangles were constructed, then **24** paper straws were used.

ID: 3c3e33bf Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that **364** paper straws of equal length were used to construct triangles and rectangles, where no two polygons had a common side. It's also given that the equation $3x + 4y = 364$ represents this situation, where x is the number of triangles constructed and y is the number of rectangles constructed. The equation $(x, y) = (24, 73)$ means that if $x = 24$, then $y = 73$. Substituting **24** for x and **73** for y in $3x + 4y = 364$ yields $3(24) + 4(73) = 364$, or $364 = 364$, which is true. Therefore, in this context, the equation $(x, y) = (24, 73)$ means that if **24** triangles were constructed, then **73** rectangles were constructed.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID 367c70cb

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 367c70cb

What is the equation of the line that passes through the point $(0, 5)$ and is parallel to the graph of $y = 7x + 4$ in the xy -plane?

- A. $y = 5x$
- B. $y = 7x + 5$
- C. $y = 7x$
- D. $y = 5x + 7$

ID: 367c70cb Answer

Correct Answer: B

Rationale

Choice B is correct. The equation of a line in the xy -plane can be written in slope-intercept form $y = mx + b$, where m is the slope of the line and $(0, b)$ is its y -intercept. It's given that the line passes through the point $(0, 5)$. Therefore, $b = 5$. It's also given that the line is parallel to the graph of $y = 7x + 4$, which means the line has the same slope as the graph of $y = 7x + 4$. The slope of the graph of $y = 7x + 4$ is 7. Therefore, $m = 7$. Substituting 7 for m and 5 for b in the equation $y = mx + b$ yields $y = 7x + 5$.

Choice A is incorrect. The graph of this equation passes through the point $(0, 0)$, not $(0, 5)$, and has a slope of 5, not 7.

Choice C is incorrect. The graph of this equation passes through the point $(0, 0)$, not $(0, 5)$.

Choice D is incorrect. The graph of this equation passes through the point $(0, 7)$, not $(0, 5)$, and has a slope of 5, not 7.

Question Difficulty: Medium

Question ID 1de8694d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear equations in two variables	Medium

ID: 1de8694d

x	y
0	18
1	13
2	8

The table shows three values of x and their corresponding values of y . There is a linear relationship between x and y . Which of the following equations represents this relationship?

- A. $y = 18x + 13$
- B. $y = 18x + 18$
- C. $y = -5x + 13$
- D. $y = -5x + 18$

ID: 1de8694d Answer

Correct Answer: D

Rationale

Choice D is correct. A linear relationship can be represented by an equation of the form $y = mx + b$, where m and b are constants. It's given in the table that when $x = 0, y = 18$. Substituting 0 for x and 18 for y in $y = mx + b$ yields $18 = m(0) + b$, or $18 = b$. Substituting 18 for b in the equation $y = mx + b$ yields $y = mx + 18$. It's also given in the table that when $x = 1, y = 13$. Substituting 1 for x and 13 for y in the equation $y = mx + 18$ yields $13 = m(1) + 18$, or $13 = m + 18$. Subtracting 18 from both sides of this equation yields $-5 = m$. Therefore, the equation $y = -5x + 18$ represents the relationship between x and y .

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