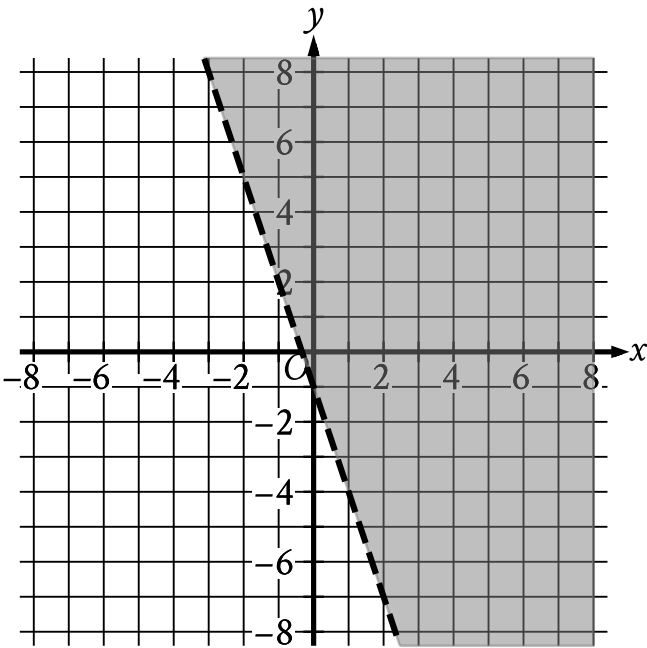


Question ID f6809431

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: f6809431



The shaded region shown represents the solutions to which inequality?

- A. $y < -1 + 3x$
- B. $y < -1 - 3x$
- C. $y > -1 + 3x$
- D. $y > -1 - 3x$

ID: f6809431 Answer

Correct Answer: D

Rationale

Choice D is correct. The equation for the line representing the boundary of the shaded region can be written in slope-intercept form $y = b + mx$, where m is the slope and $(0, b)$ is the y -intercept of the line. For the graph shown, the boundary line passes through the points $(0, -1)$ and $(1, -4)$. Given two points on a line, (x_1, y_1) and (x_2, y_2) , the slope of the line can be calculated using the equation $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting the points $(0, -1)$ and $(1, -4)$ for (x_1, y_1) and (x_2, y_2) in this equation yields $m = \frac{-4 - (-1)}{1 - 0}$, which is equivalent to $m = \frac{-3}{1}$, or $m = -3$. Since the point $(0, -1)$ represents the y -intercept, it follows that $b = -1$. Substituting -3 for m and -1 for b in the equation $y = b + mx$ yields $y = -1 - 3x$ as the equation of the boundary line. Since the shaded region represents all the points above this boundary line, it follows that the shaded region shown represents the solutions to the inequality $y > -1 - 3x$.

Choice A is incorrect. This inequality represents a region below, not above, a boundary line with a slope of **3**, not **−3**.

Choice B is incorrect. This inequality represents a region below, not above, the boundary line shown.

Choice C is incorrect. This inequality represents a region whose boundary line has a slope of **3**, not **−3**.

Question Difficulty: Hard

Question ID 153dbaa0

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 153dbaa0

A city employee will plant two types of bushes, azaleas and boxwoods, in a park. There will be no more than **164** total bushes planted, and the number of azaleas planted will be at most three times the number of boxwoods planted. Which of the following systems of inequalities best represents this situation, where ***a*** is the number of azaleas that will be planted, and ***b*** is the number of boxwoods that will be planted?

- A. $a + b \geq 164$
 $3a \geq b$
- B. $a + b \geq 164$
 $a \leq 3b$
- C. $a + b \leq 164$
 $3a \geq b$
- D. $a + b \leq 164$
 $a \leq 3b$

ID: 153dbaa0 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that a city employee will plant azaleas and boxwoods in a park, where ***a*** is the number of azaleas that will be planted and ***b*** is the number of boxwoods that will be planted. It's also given that there will be no more than **164** total bushes planted, which can be represented by the inequality $a + b \leq 164$. It's also given that the number of azaleas planted will be at most three times the number of boxwoods planted, which can be represented by the inequality $a \leq 3b$. Therefore, the system of inequalities containing $a + b \leq 164$ and $a \leq 3b$ best represents this situation.

Choice A is incorrect. The inequality $a + b \geq 164$ represents a situation where at least **164** total bushes will be planted, not that there will be no more than **164** total bushes planted. Also, the inequality $3a \geq b$ represents a situation where the number of boxwoods that will be planted is at most three times the number of azaleas that will be planted, not that the number of azaleas planted will be at most three times the number of boxwoods planted.

Choice B is incorrect. The inequality $a + b \geq 164$ represents a situation where at least **164** total bushes will be planted, not that there will be no more than **164** total bushes planted.

Choice C is incorrect. The inequality $3a \geq b$ represents a situation where the number of boxwoods that will be planted is at most three times the number of azaleas that will be planted, not that the number of azaleas planted will be at most three times the number of boxwoods planted.

Question Difficulty: Hard

Question ID 90381488

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 90381488

$$11x + 14y \leq 115$$

Anthony will spend at most \$115 to purchase x small cheese pizzas and y large cheese pizzas for a team dinner. The given inequality represents this situation. Which of the following is the best interpretation of $14y$ in this context?

- A. The amount, in dollars, Anthony will spend on each large cheese pizza
- B. The amount, in dollars, Anthony will spend on each small cheese pizza
- C. The total amount, in dollars, Anthony will spend on large cheese pizzas
- D. The total amount, in dollars, Anthony will spend on small cheese pizzas

ID: 90381488 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that Anthony will spend at most \$115 to purchase x small cheese pizzas and y large cheese pizzas. In the inequality $11x + 14y \leq 115$, y represents the number of large cheese pizzas that Anthony will purchase. This means the coefficient 14 represents the amount, in dollars, Anthony will spend on each large cheese pizza. Therefore, the best interpretation of $14y$ in this context is the total amount, in dollars, Anthony will spend on large cheese pizzas.

Choice A is incorrect. This is the best interpretation of 14 , not $14y$.

Choice B is incorrect. This is the best interpretation of 11 , not $14y$.

Choice D is incorrect. This is the best interpretation of $11x$, not $14y$.

Question Difficulty: Hard

Question ID 58740e7b

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 58740e7b

A salesperson’s total earnings consist of a base salary of x dollars per year, plus commission earnings of **11%** of the total sales the salesperson makes during the year. This year, the salesperson has a goal for the total earnings to be at least **3** times and at most **4** times the base salary. Which of the following inequalities represents all possible values of total sales s , in dollars, the salesperson can make this year in order to meet that goal?

- A. $2x \leq s \leq 3x$
- B. $\frac{2}{0.11}x \leq s \leq \frac{3}{0.11}x$
- C. $3x \leq s \leq 4x$
- D. $\frac{3}{0.11}x \leq s \leq \frac{4}{0.11}x$

ID: 58740e7b Answer

Correct Answer: B

Rationale

Choice B is correct. It’s given that a salesperson’s total earnings consist of a base salary of x dollars per year plus commission earnings of **11%** of the total sales the salesperson makes during the year. If the salesperson makes s dollars in total sales this year, the salesperson’s total earnings can be represented by the expression $x + 0.11s$. It’s also given that the salesperson has a goal for the total earnings to be at least **3** times and at most **4** times the base salary, which can be represented by the expressions $3x$ and $4x$, respectively. Therefore, this situation can be represented by the inequality $3x \leq x + 0.11s \leq 4x$. Subtracting x from each part of this inequality yields $2x \leq 0.11s \leq 3x$. Dividing each part of this inequality by **0.11** yields $\frac{2}{0.11}x \leq s \leq \frac{3}{0.11}x$. Therefore, the inequality $\frac{2}{0.11}x \leq s \leq \frac{3}{0.11}x$ represents all possible values of total sales s , in dollars, the salesperson can make this year in order to meet their goal.

Choice A is incorrect. This inequality represents a situation in which the total sales, rather than the total earnings, are at least **2** times and at most **3** times, rather than at least **3** times and at most **4** times, the base salary.

Choice C is incorrect. This inequality represents a situation in which the total sales, rather than the total earnings, are at least **3** times and at most **4** times the base salary.

Choice D is incorrect. This inequality represents a situation in which the total earnings are at least **4** times and at most **5** times, rather than at least **3** times and at most **4** times, the base salary.

Question Difficulty: Hard

Question ID 31cb1ec6

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 31cb1ec6

$2x - y > 883$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given inequality?

A.

x	y
440	0
441	-2
442	-4

B.

x	y
440	0
442	-2
441	-4

C.

x	y
442	0
440	-2
441	-4

D.

x	y
442	0
441	-2
440	-4

ID: 31cb1ec6 Answer

Correct Answer: D

Rationale

Choice D is correct. All the tables in the choices have the same three values of x , **440**, **441**, and **442**, so each of the three values of x can be substituted in the given inequality to compare the corresponding values of y in each of the tables.

Substituting 440 for x in the given inequality yields $2(440) - y > 883$, or $880 - y > 883$. Subtracting 880 from both sides of this inequality yields $-y > 3$. Dividing both sides of this inequality by -1 yields $y < -3$. Therefore, when $x = 440$, the corresponding value of y must be less than -3 . Substituting 441 for x in the given inequality yields $2(441) - y > 883$, or $882 - y > 883$. Subtracting 882 from both sides of this inequality yields $-y > 1$. Dividing both sides of this inequality by -1 yields $y < -1$. Therefore, when $x = 441$, the corresponding value of y must be less than -1 . Substituting 442 for x in the given inequality yields $2(442) - y > 883$, or $884 - y > 883$. Subtracting 884 from both sides of this inequality yields $-y > -1$. Dividing both sides of this inequality by -1 yields $y < 1$. Therefore, when $x = 442$, the corresponding value of y must be less than 1 . For the table in choice D, when $x = 440$, the corresponding value of y is -4 , which is less than -3 ; when $x = 441$, the corresponding value of y is -2 , which is less than -1 ; when $x = 442$, the corresponding value of y is 0 , which is less than 1 . Therefore, the table in choice D gives values of x and their corresponding values of y that are all solutions to the given inequality.

Choice A is incorrect. When $x = 440$, the corresponding value of y in this table is 0 , which isn't less than -3 .

Choice B is incorrect. When $x = 440$, the corresponding value of y in this table is 0 , which isn't less than -3 .

Choice C is incorrect. When $x = 440$, the corresponding value of y in this table is -2 , which isn't less than -3 .

Question Difficulty: Hard

Question ID ede444e6

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: ede444e6

The minimum value of x is **12** less than **6** times another number n . Which inequality shows the possible values of x ?

- A. $x \leq 6n - 12$
- B. $x \geq 6n - 12$
- C. $x \leq 12 - 6n$
- D. $x \geq 12 - 6n$

ID: ede444e6 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the minimum value of x is **12** less than **6** times another number n . Therefore, the possible values of x are all greater than or equal to the value of **12** less than **6** times n . The value of **6** times n is given by the expression $6n$. The value of **12** less than $6n$ is given by the expression $6n - 12$. Therefore, the possible values of x are all greater than or equal to $6n - 12$. This can be shown by the inequality $x \geq 6n - 12$.

Choice A is incorrect. This inequality shows the possible values of x if the maximum, not the minimum, value of x is **12** less than **6** times n .

Choice C is incorrect. This inequality shows the possible values of x if the maximum, not the minimum, value of x is **6** times n less than **12**, not **12** less than **6** times n .

Choice D is incorrect. This inequality shows the possible values of x if the minimum value of x is **6** times n less than **12**, not **12** less than **6** times n .

Question Difficulty: Hard

Question ID 2150c15c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 2150c15c

A business owner plans to purchase the same model of chair for each of the **81** employees. The total budget to spend on these chairs is **\$14,000**, which includes a **7%** sales tax. Which of the following is closest to the maximum possible price per chair, before sales tax, the business owner could pay based on this budget?

- A. **\$148.15**
- B. **\$161.53**
- C. **\$172.84**
- D. **\$184.94**

ID: 2150c15c Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that a business owner plans to purchase **81** chairs. If **p** is the price per chair, the total price of purchasing **81** chairs is **$81p$** . It's also given that **7%** sales tax is included, which is equivalent to **$81p$** multiplied by **1.07**, or **$81(1.07)p$** . Since the total budget is **\$14,000**, the inequality representing the situation is given by **$81(1.07)p \leq 14,000$** . Dividing both sides of this inequality by **$81(1.07)$** and rounding the result to two decimal places gives **$p \leq 161.53$** . To not exceed the budget, the maximum possible price per chair is **\$161.53**.

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

Choice C is incorrect. This is the maximum possible price per chair including sales tax, not the maximum possible price per chair before sales tax.

Choice D is incorrect. This is the maximum possible price if the sales tax is added to the total budget, not the maximum possible price per chair before sales tax.

Question Difficulty: Hard

Question ID 9020873d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 9020873d

In a set of four consecutive odd integers, where the integers are ordered from least to greatest, the first integer is represented by x . The product of **12** and the fourth odd integer is at most **26** less than the sum of the first and third odd integers. Which inequality represents this situation?

- A. $12(x + 6) \leq x + (x + 4) - 26$
- B. $12(x + 6) \geq 26 - (x + (x + 4))$
- C. $12(x + 4) \leq x + (x + 3) - 26$
- D. $12(x + 4) \geq 26 - (x + (x + 3))$

ID: 9020873d Answer

Correct Answer: A

Rationale

Choice A is correct. It’s given that the four odd integers are consecutive, ordered from least to greatest, and that the first odd integer is represented by x . It follows that the second odd integer is represented by $x + 2$, the third odd integer is represented by $x + 4$, and the fourth odd integer is represented by $x + 6$. Therefore, the product of **12** and the fourth odd integer is represented by $12(x + 6)$, and **26** less than the sum of the first and third odd integers is represented by $x + (x + 4) - 26$. Since the product of **12** and the fourth odd integer is at most **26** less than the sum of the first and third odd integers, it follows that $12(x + 6) \leq x + (x + 4) - 26$.

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: Hard

Question ID 3921f7b2

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 3921f7b2

A particular botanist classifies a species of plant as tall if its typical height when fully grown is more than **100** centimeters. Each of the following inequalities represents the possible heights h , in centimeters, for a specific plant species when fully grown. Which inequality represents the possible heights h , in centimeters, for a tall plant species?

- A. $106 < h < 158$
- B. $80 < h < 100$
- C. $42 < h < 87$
- D. $17 < h < 85$

ID: 3921f7b2 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that a particular botanist classifies a species of plant as tall if its typical height when fully grown is more than **100** centimeters. The inequality $106 < h < 158$ represents possible heights h , in centimeters, for a plant species when fully grown where h is between **106** and **158** centimeters. Since all values of h in this inequality are greater than **100** centimeters, this inequality represents the possible heights for a tall plant species.

Choice B is incorrect. This inequality represents possible heights h , in centimeters, for a plant species when fully grown where h is between **80** and **100** centimeters, not more than **100** centimeters.

Choice C is incorrect. This inequality represents possible heights h , in centimeters, for a plant species when fully grown where h is between **42** and **87** centimeters, not more than **100** centimeters.

Choice D is incorrect. This inequality represents possible heights h , in centimeters, for a plant species when fully grown where h is between **17** and **85** centimeters, not more than **100** centimeters.

Question Difficulty: Hard

Question ID 8b53d350

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 8b53d350

$y > 4x + 8$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given inequality?

A.

x	y
2	19
4	30
6	41

B.

x	y
2	8
4	16
6	24

C.

x	y
2	13
4	18
6	23

D.

x	y
2	13
4	21
6	29

ID: 8b53d350 Answer

Correct Answer: A

Rationale

Choice A is correct. In each choice, the values of x are 2, 4, and 6. Substituting the first value of x , 2, for x in the given inequality yields $y > 4(2) + 8$, or $y > 16$. Therefore, when $x = 2$, the corresponding value of y must be greater than 16

. Of the given choices, only choice A is a table where the value of y corresponding to $x = 2$ is greater than 16 . To confirm that the other values of x in this table and their corresponding values of y are also solutions to the given inequality, the values of x and y in the table can be substituted for x and y in the given inequality. Substituting 4 for x and 30 for y in the given inequality yields $30 > 4(4) + 8$, or $30 > 24$, which is true. Substituting 6 for x and 41 for y in the given inequality yields $41 > 4(6) + 8$, or $41 > 32$, which is true. It follows that for choice A, all the values of x and their corresponding values of y are solutions to the given inequality.

Choice B is incorrect. Substituting 2 for x and 8 for y in the given inequality yields $8 > 4(2) + 8$, or $8 > 16$, which is false.

Choice C is incorrect. Substituting 2 for x and 13 for y in the given inequality yields $13 > 4(2) + 8$, or $13 > 16$, which is false.

Choice D is incorrect. Substituting 2 for x and 13 for y in the given inequality yields $13 > 4(2) + 8$, or $13 > 16$, which is false.

Question Difficulty: Hard

Question ID 76b636f2

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 76b636f2

A number x is at most 17 less than 5 times the value of y . If the value of y is 3, what is the greatest possible value of x ?

ID: 76b636f2 Answer

Correct Answer: -2

Rationale

The correct answer is -2 . It's given that a number x is at most 17 less than 5 times the value of y , or $x \leq 5y - 17$. Substituting 3 for y in this inequality yields $x \leq 5(3) - 17$, or $x \leq -2$. Thus, if the value of y is 3, the greatest possible value of x is -2 .

Question Difficulty: Hard

Question ID c4afe86c

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: c4afe86c

A model estimates that whales from the genus *Eschrichtius* travel **72** to **77** miles in the ocean each day during their migration. Based on this model, which inequality represents the estimated total number of miles, x , a whale from the genus *Eschrichtius* could travel in **16** days of its migration?

- A. $72 + 16 \leq x \leq 77 + 16$
- B. $(72)(16) \leq x \leq (77)(16)$
- C. $72 \leq 16 + x \leq 77$
- D. $72 \leq 16x \leq 77$

ID: c4afe86c Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the model estimates that whales from the genus *Eschrichtius* travel **72** to **77** miles in the ocean each day during their migration. If one of these whales travels **72** miles each day for **16** days, then the whale travels **72(16)** miles total. If one of these whales travels **77** miles each day for **16** days, then the whale travels **77(16)** miles total. Therefore, the model estimates that in **16** days of its migration, a whale from the genus *Eschrichtius* could travel at least **72(16)** and at most **77(16)** miles total. Thus, the inequality $(72)(16) \leq x \leq (77)(16)$ represents the estimated total number of miles, x , a whale from the genus *Eschrichtius* could travel in **16** days of its migration.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Hard

Question ID c5223e7a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: c5223e7a

The triangle inequality theorem states that the sum of any two sides of a triangle must be greater than the length of the third side. If a triangle has side lengths of **6** and **12**, which inequality represents the possible lengths, x , of the third side of the triangle?

- A. $x < 18$
- B. $x > 18$
- C. $6 < x < 18$
- D. $x < 6$ or $x > 18$

ID: c5223e7a Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that a triangle has side lengths of **6** and **12**, and x represents the length of the third side of the triangle. It's also given that the triangle inequality theorem states that the sum of any two sides of a triangle must be greater than the length of the third side. Therefore, the inequalities $6 + x > 12$, $6 + 12 > x$, and $12 + x > 6$ represent all possible values of x . Subtracting **6** from both sides of the inequality $6 + x > 12$ yields $x > 12 - 6$, or $x > 6$. Adding **6** and **12** in the inequality $6 + 12 > x$ yields $18 > x$, or $x < 18$. Subtracting **12** from both sides of the inequality $12 + x > 6$ yields $x > 6 - 12$, or $x > -6$. Since all x -values that satisfy the inequality $x > 6$ also satisfy the inequality $x > -6$, it follows that the inequalities $x > 6$ and $x < 18$ represent the possible values of x . Therefore, the inequality $6 < x < 18$ represents the possible lengths, x , of the third side of the triangle.

Choice A is incorrect. This inequality gives the upper bound for x but does not include its lower bound.

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: Hard

Question ID 765f5fcb

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 765f5fcb

$y > 7x - 4$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given inequality?

A.

x	y
3	13
5	27
8	48

B.

x	y
3	17
5	31
8	52

C.

x	y
3	21
5	27
8	52

D.

x	y
3	21
5	35
8	56

ID: 765f5fcb Answer

Correct Answer: D

Rationale

Choice D is correct. A solution (x, y) to the given inequality is a value of x and the corresponding value of y such that the value of y is greater than the value of $7x - 4$. All the tables in the choices have the same three values of x , so each

of the three values of x can be substituted in the given inequality to compare the corresponding values of y in each of the tables. Substituting **3** for x in the given inequality yields $y > 7(3) - 4$, or $y > 17$. Substituting **5** for x in the given inequality yields $y > 7(5) - 4$, or $y > 31$. Substituting **8** for x in the given inequality yields $y > 7(8) - 4$, or $y > 52$. Therefore, when $x = 3$, $x = 5$, and $x = 8$, the corresponding values of y must be greater than **17**, greater than **31**, and greater than **52**, respectively. In the table in choice D, when $x = 3$, the corresponding value of y is **21**, which is greater than **17**; when $x = 5$, the corresponding value of y is **35**, which is greater than **31**; when $x = 8$, the corresponding value of y is **56**, which is greater than **52**. Of the given choices, only choice D gives values of x and their corresponding values of y that are all solutions to the given inequality.

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: Hard

Question ID 38389fcd

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 38389fcd

A moving truck can tow a trailer if the combined weight of the trailer and the boxes it contains is no more than **4,600** pounds. What is the maximum number of boxes this truck can tow in a trailer with a weight of **500** pounds if each box weighs **120** pounds?

- A. **34**
- B. **35**
- C. **38**
- D. **39**

ID: 38389fcd Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the truck can tow a trailer if the combined weight of the trailer and the boxes it contains is no more than **4,600** pounds. If the trailer has a weight of **500** pounds and each box weighs **120** pounds, the expression **$500 + 120b$** , where **b** is the number of boxes, gives the combined weight of the trailer and the boxes. Since the combined weight must be no more than **4,600** pounds, the possible numbers of boxes the truck can tow are given by the inequality **$500 + 120b \leq 4,600$** . Subtracting **500** from both sides of this inequality yields **$120b \leq 4,100$** . Dividing both sides of this inequality by **120** yields **$b \leq \frac{205}{6}$** , or **b** is less than or equal to approximately **34.17**. Since the number of boxes, **b** , must be a whole number, the maximum number of boxes the truck can tow is the greatest whole number less than **34.17**, which is **34**.

Choice B is incorrect. Towing the trailer and **35** boxes would yield a combined weight of **4,700** pounds, which is greater than **4,600** pounds.

Choice C is incorrect. Towing the trailer and **38** boxes would yield a combined weight of **5,060** pounds, which is greater than **4,600** pounds.

Choice D is incorrect. Towing the trailer and **39** boxes would yield a combined weight of **5,180** pounds, which is greater than **4,600** pounds.

Question Difficulty: Hard

Question ID 07af52a4

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 07af52a4

A small business owner budgets \$2,200 to purchase candles. The owner must purchase a minimum of 200 candles to maintain the discounted pricing. If the owner pays \$4.90 per candle to purchase small candles and \$11.60 per candle to purchase large candles, what is the maximum number of large candles the owner can purchase to stay within the budget and maintain the discounted pricing?

ID: 07af52a4 Answer

Correct Answer: 182

Rationale

The correct answer is 182. Let s represent the number of small candles the owner can purchase, and let ℓ represent the number of large candles the owner can purchase. It's given that the owner pays \$4.90 per candle to purchase small candles and \$11.60 per candle to purchase large candles. Therefore, the owner pays $4.90s$ dollars for s small candles and 11.60ℓ dollars for ℓ large candles, which means the owner pays a total of $4.90s + 11.60\ell$ dollars to purchase candles. It's given that the owner budgets \$2,200 to purchase candles. Therefore, $4.90s + 11.60\ell \leq 2,200$. It's also given that the owner must purchase a minimum of 200 candles. Therefore, $s + \ell \geq 200$. The inequalities $4.90s + 11.60\ell \leq 2,200$ and $s + \ell \geq 200$ can be combined into one compound inequality by rewriting the second inequality so that its left-hand side is equivalent to the left-hand side of the first inequality. Subtracting ℓ from both sides of the inequality $s + \ell \geq 200$ yields $s \geq 200 - \ell$. Multiplying both sides of this inequality by 4.90 yields $4.90s \geq 4.90(200 - \ell)$, or $4.90s \geq 980 - 4.90\ell$. Adding 11.60ℓ to both sides of this inequality yields $4.90s + 11.60\ell \geq 980 - 4.90\ell + 11.60\ell$, or $4.90s + 11.60\ell \geq 980 + 6.70\ell$. This inequality can be combined with the inequality $4.90s + 11.60\ell \leq 2,200$, which yields the compound inequality $980 + 6.70\ell \leq 4.90s + 11.60\ell \leq 2,200$. It follows that $980 + 6.70\ell \leq 2,200$. Subtracting 980 from both sides of this inequality yields $6.70\ell \leq 2,200$. Dividing both sides of this inequality by 6.70 yields approximately $\ell \leq 182.09$. Since the number of large candles the owner purchases must be a whole number, the maximum number of large candles the owner can purchase is the largest whole number less than 182.09, which is 182.

Question Difficulty: Hard

Question ID 6ec27879

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 6ec27879

The length of a rectangle is **50** inches and the width is x inches. The perimeter is at most **210** inches. Which inequality represents this situation?

- A. $2x + 100 \leq 210$
- B. $2x + 100 \geq 210$
- C. $2x + 50 \leq 210$
- D. $2x + 50 \geq 210$

ID: 6ec27879 Answer

Correct Answer: A

Rationale

Choice A is correct. The perimeter of a rectangle is equal to the sum of **2** times its length and **2** times its width. It's given that the rectangle's length is **50** inches and the width is x inches. Therefore, the perimeter, in inches, is $2(50) + 2x$, or $100 + 2x$, which is equivalent to $2x + 100$. It's given that the perimeter is at most **210** inches; therefore, $2x + 100 \leq 210$ represents this situation.

Choice B is incorrect. This inequality represents a situation where the perimeter is at least, rather than at most, **210** inches.

Choice C is incorrect. This inequality represents a situation where **2** times the length, rather than the length, is **50** inches.

Choice D is incorrect. This inequality represents a situation where **2** times the length, rather than the length, is **50** inches, and the perimeter is at least, rather than at most, **210** inches.

Question Difficulty: Hard

Question ID da3a02f4

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: da3a02f4

A truck can haul a maximum weight of **5,630** pounds. During one trip, the truck will be used to haul a **190**-pound piece of equipment as well as several crates. Some of these crates weigh **25** pounds each and the others weigh **62** pounds each. Which inequality represents the possible combinations of the number of **25**-pound crates, x , and the number of **62**-pound crates, y , the truck can haul during one trip if only the piece of equipment and the crates are being hauled?

- A. $25x + 62y \leq 5,440$
- B. $25x + 62y \geq 5,440$
- C. $62x + 25y \leq 5,630$
- D. $62x + 25y \geq 5,630$

ID: da3a02f4 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that a truck can haul a maximum of **5,630** pounds. It's also given that during one trip, the truck will be used to haul a **190**-pound piece of equipment as well as several crates. It follows that the truck can haul at most **5,630 — 190**, or **5,440**, pounds of crates. Since x represents the number of **25**-pound crates, the expression $25x$ represents the weight of the **25**-pound crates. Since y represents the number of **62**-pound crates, $62y$ represents the weight of the **62**-pound crates. Therefore, $25x + 62y$ represents the total weight of the crates the truck can haul. Since the truck can haul at most **5,440** pounds of crates, the total weight of the crates must be less than or equal to **5,440** pounds, or $25x + 62y \leq 5,440$.

Choice B is incorrect. This represents the possible combinations of the number of **25**-pound crates, x , and the number of **62**-pound crates, y , the truck can haul during one trip if it can haul a minimum, not a maximum, of **5,630** pounds.

Choice C is incorrect. This represents the possible combinations of the number of **62**-pound crates, x , and the number of **25**-pound crates, y , the truck can haul during one trip if only crates are being hauled.

Choice D is incorrect. This represents the possible combinations of the number of **62**-pound crates, x , and the number of **25**-pound crates, y , the truck can haul during one trip if it can haul a minimum, not a maximum, weight of **5,630** pounds and only crates are being hauled.

Question Difficulty: Hard

Question ID 36d51706

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 36d51706

A team hosting an event to raise money for new uniforms plans to sell at least **140** tickets before this event and at least **220** tickets during this event to raise a total of at least **\$5,820** from all tickets sold. The price of a ticket during this event is **\$3** less than the price of a ticket before this event. Which inequality represents this situation, where x is the price, in dollars, of a ticket sold during this event?

- A. $140(x + 3) + 220x \leq 5,820$
- B. $140(x + 3) + 220x \geq 5,820$
- C. $140(x - 3) + 220x \leq 5,820$
- D. $140(x - 3) + 220x \geq 5,820$

ID: 36d51706 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that a team plans to sell at least **140** tickets before an event and at least **220** tickets during the event to raise a total of at least **\$5,820** from all tickets sold. It's also given that the price of a ticket during the event is **\$3** less than the price of a ticket before the event and that x represents the price, in dollars, of a ticket sold during the event. It follows that $x + 3$ represents the price, in dollars, of a ticket sold before the event. The expression $140(x + 3)$ represents the planned revenue, in dollars, from the tickets sold before the event, and the expression $220x$ represents the planned revenue, in dollars, from the tickets sold during the event. Thus, the expression $140(x + 3) + 220x$ represents the planned revenue, in dollars, from all tickets sold. Since the team plans to raise a total of at least **\$5,820** from all tickets sold, the total revenue must be at least **\$5,820**. Therefore, the inequality $140(x + 3) + 220x \geq 5,820$ represents this situation.

Choice A is incorrect. This inequality represents a situation in which the team raises a total of at most **\$5,820** from all tickets sold.

Choice C is incorrect. This inequality represents a situation in which the price of a ticket before the event is **\$3** less, rather than **\$3** more, than the price of a ticket during the event and the team raises a total of at most **\$5,820** from all tickets sold.

Choice D is incorrect. This inequality represents a situation in which the price of a ticket before the event is **\$3** less, rather than **\$3** more, than the price of a ticket during the event.

Question Difficulty: Hard

Question ID 52d1b8ac

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 52d1b8ac

An event planner is planning a party. It costs the event planner a onetime fee of **\$35** to rent the venue and **\$10.25** per attendee. The event planner has a budget of **\$300**. What is the greatest number of attendees possible without exceeding the budget?

ID: 52d1b8ac Answer

Correct Answer: 25

Rationale

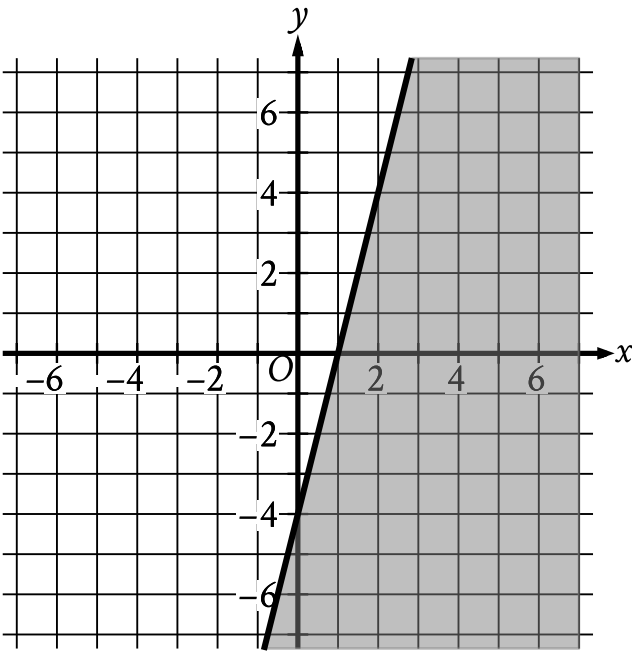
The correct answer is **25**. The total cost of the party is found by adding the onetime fee of the venue to the cost per attendee times the number of attendees. Let x be the number of attendees. The expression $35 + 10.25x$ thus represents the total cost of the party. It's given that the budget is **\$300**, so this situation can be represented by the inequality $35 + 10.25x \leq 300$. Subtracting **35** from both sides of this inequality gives $10.25x \leq 265$. Dividing both sides of this inequality by **10.25** results in approximately $x \leq 25.854$. Since the question is stated in terms of attendees, rounding **25.854** down to the greatest whole number gives the greatest number of attendees possible, which is **25**.

Question Difficulty: Hard

Question ID f0bf037b

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: f0bf037b



The shaded region shown represents the solutions to an inequality. Which ordered pair (x, y) is a solution to this inequality?

- A. $(-5, -6)$
- B. $(-2, 5)$
- C. $(1, 4)$
- D. $(6, -2)$

ID: f0bf037b Answer

Correct Answer: D

Rationale

Choice D is correct. Since the shaded region shown represents the solutions to an inequality, an ordered pair (x, y) is a solution to the inequality if it's represented by a point in the shaded region. Of the given choices, only $(6, -2)$ is represented by a point in the shaded region. Therefore, the ordered pair $(6, -2)$ is a solution to this inequality.

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 ID 9074a76a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 9074a76a

$$\begin{aligned}y &\leq x + 7 \\ y &\geq -2x - 1\end{aligned}$$

Which point (x, y) is a solution to the given system of inequalities in the xy -plane?

- A. $(-14, 0)$
- B. $(0, -14)$
- C. $(0, 14)$
- D. $(14, 0)$

ID: 9074a76a Answer

Correct Answer: D

Rationale

Choice D is correct. A point (x, y) is a solution to a system of inequalities in the xy -plane if substituting the x -coordinate and the y -coordinate of the point for x and y , respectively, in each inequality makes both of the inequalities true. Substituting the x -coordinate and the y -coordinate of choice D, **14** and **0**, for x and y , respectively, in the first inequality in the given system, $y \leq x + 7$, yields $0 \leq 14 + 7$, or $0 \leq 21$, which is true. Substituting **14** for x and **0** for y in the second inequality in the given system, $y \geq -2x - 1$, yields $0 \geq -2(14) - 1$, or $0 \geq -29$, which is true. Therefore, the point **(14, 0)** is a solution to the given system of inequalities in the xy -plane.

Choice A is incorrect. Substituting **-14** for x and **0** for y in the inequality $y \leq x + 7$ yields $0 \leq -14 + 7$, or $0 \leq -7$, which is not true.

Choice B is incorrect. Substituting **0** for x and **-14** for y in the inequality $y \geq -2x - 1$ yields $-14 \geq -2(0) - 1$, or $-14 \geq -1$, which is not true.

Choice C is incorrect. Substituting **0** for x and **14** for y in the inequality $y \leq x + 7$ yields $14 \leq 0 + 7$, or $14 \leq 7$, which is not true.

Question Difficulty: Hard

Question ID b33a401e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: b33a401e

A number x is at most 2 less than 3 times the value of y . If the value of y is -4 , what is the greatest possible value of x ?

ID: b33a401e Answer

Correct Answer: -14

Rationale

The correct answer is -14 . It's given that a number x is at most 2 less than 3 times the value of y . Therefore, x is less than or equal to 2 less than 3 times the value of y . The expression $3y$ represents 3 times the value of y . The expression $3y - 2$ represents 2 less than 3 times the value of y . Therefore, x is less than or equal to $3y - 2$. This can be shown by the inequality $x \leq 3y - 2$. Substituting -4 for y in this inequality yields $x \leq 3(-4) - 2$ or, $x \leq -14$. Therefore, if the value of y is -4 , the greatest possible value of x is -14 .

Question Difficulty: Hard

Question ID 87423f12

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 87423f12

$$\begin{aligned}y &< x \\ x &< 22\end{aligned}$$

For which of the following tables are all the values of x and their corresponding values of y solutions to the given system of inequalities?

A.

x	y
19	18
20	19
21	20

B.

x	y
19	20
20	21
21	22

C.

x	y
23	22
24	23
25	24

D.

x	y
23	24
24	25
25	26

ID: 87423f12 Answer

Correct Answer: A

Rationale

Choice A is correct. The inequality $y < x$ indicates that for any solution to the given system of inequalities, the value of x must be greater than the corresponding value of y . The inequality $x < 22$ indicates that for any solution to the given system of inequalities, the value of x must be less than 22 . Of the given choices, only choice A contains values of x that are each greater than the corresponding value of y and less than 22 . Therefore, for choice A, all the values of x and their corresponding values of y are solutions to the given system of inequalities.

Choice B is incorrect. The values in this table aren't solutions to the inequality $y < x$.

Choice C is incorrect. The values in this table aren't solutions to the inequality $x < 22$.

Choice D is incorrect. The values in this table aren't solutions to the inequality $y < x$ or the inequality $x < 22$.

Question Difficulty: Hard

Question ID 1527f649

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 1527f649

For a snowstorm in a certain town, the minimum rate of snowfall recorded was **0.6** inches per hour, and the maximum rate of snowfall recorded was **1.8** inches per hour. Which inequality is true for all values of s , where s represents a rate of snowfall, in inches per hour, recorded for this snowstorm?

- A. $s \geq 2.4$
- B. $s \geq 1.8$
- C. $0 \leq s \leq 0.6$
- D. $0.6 \leq s \leq 1.8$

ID: 1527f649 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that for a snowstorm in a certain town, the minimum rate of snowfall recorded was **0.6** inches per hour, the maximum rate of snowfall recorded was **1.8** inches per hour, and s represents a rate of snowfall, in inches per hour, recorded for this snowstorm. It follows that the inequality **$0.6 \leq s \leq 1.8$** is true for all values of s .

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: Hard

Question ID ffcded1d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: ffcded1d

$$\begin{aligned}y &> 14 \\ 4x + y &< 18\end{aligned}$$

The point $(x, 53)$ is a solution to the system of inequalities in the xy -plane. Which of the following could be the value of x ?

- A. -9
- B. -5
- C. 5
- D. 9

ID: ffcded1d Answer

Correct Answer: A

Rationale

Choice A is correct. It’s given that the point $(x, 53)$ is a solution to the given system of inequalities in the xy -plane. This means that the coordinates of the point, when substituted for the variables x and y , make both of the inequalities in the system true. Substituting 53 for y in the inequality $y > 14$ yields $53 > 14$, which is true. Substituting 53 for y in the inequality $4x + y < 18$ yields $4x + 53 < 18$. Subtracting 53 from both sides of this inequality yields $4x < -35$. Dividing both sides of this inequality by 4 yields $x < -8.75$. Therefore, x must be a value less than -8.75 . Of the given choices, only -9 is less than -8.75 .

Choice B is incorrect. Substituting -5 for x and 53 for y in the inequality $4x + y < 18$ yields $4(-5) + 53 < 18$, or $33 < 18$, which is not true.

Choice C is incorrect. Substituting 5 for x and 53 for y in the inequality $4x + y < 18$ yields $4(5) + 53 < 18$, or $73 < 18$, which is not true.

Choice D is incorrect. Substituting 9 for x and 53 for y in the inequality $4x + y < 18$ yields $4(9) + 53 < 18$, or $89 < 18$, which is not true.

Question Difficulty: Hard

Question ID 54d54b1d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 54d54b1d

$$y < -4x + 4$$

Which point (x, y) is a solution to the given inequality in the xy -plane?

- A. $(-4, 0)$
- B. $(0, 5)$
- C. $(2, 1)$
- D. $(2, -1)$

ID: 54d54b1d Answer

Correct Answer: A

Rationale

Choice D is correct. For a point (x, y) to be a solution to the given inequality in the xy -plane, the value of the point's y -coordinate must be less than the value of $-4x + 4$, where x is the value of the x -coordinate of the point. This is true of the point $(-4, 0)$ because $0 < -4(-4) + 4$, or $0 < 20$. Therefore, the point $(-4, 0)$ is a solution to the given inequality.

Choices A, B, and C are incorrect. None of these points are a solution to the given inequality because each point's y -coordinate is greater than the value of $-4x + 4$ for the point's x -coordinate.

Question Difficulty: Hard

Question ID 40e1dce8

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Algebra	Linear inequalities in one or two variables	Hard

ID: 40e1dce8

An event planner is planning a party. It costs the event planner a onetime fee of **\$35** to rent the venue and **\$10.25** per attendee. The event planner has a budget of **\$200**. What is the greatest number of attendees possible without exceeding the budget?

ID: 40e1dce8 Answer

Correct Answer: 16

Rationale

The correct answer is **16**. The total cost of the party is found by adding the onetime fee of the venue to the cost per attendee times the number of attendees. Let x be the number of attendees. The expression $35 + 10.25x$ thus represents the total cost of the party. It's given that the budget is **\$200**, so this situation can be represented by the inequality $35 + 10.25x \leq 200$. The greatest number of attendees can be found by solving this inequality for x . Subtracting **35** from both sides of this inequality gives $10.25x \leq 165$. Dividing both sides of this inequality by **10.25** results in approximately $x \leq 16.098$. Since the question is stated in terms of attendees, rounding x down to the nearest whole number, **16**, gives the greatest number of attendees possible.

Question Difficulty: Hard