Question ID 57e4b0b9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 57e4b0b9

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: 57e4b0b9 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: Medium

Question ID c4fb1cb3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: c4fb1cb3

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: c4fb1cb3 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: Medium

Question ID db8d42ba

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: db8d42ba

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: db8d42ba 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.

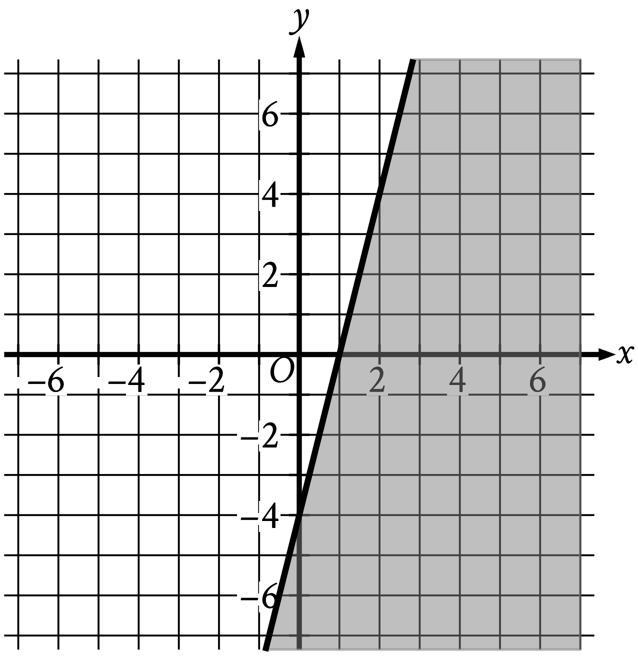
Choice D is incorrect. This inequality shows the possible values of x if the minimum value of x is 6 times n less than 12, not 12 less than 6 times n.

Question Difficulty: Medium

Question ID 698ab51d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 698ab51d



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: 698ab51d 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 Difficulty: Medium

Question ID 06836f64

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 06836f64

$$2x - y > 883$$

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: 06836f64 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: Medium

Question ID da95cd89

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: da95cd89

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: da95cd89 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.

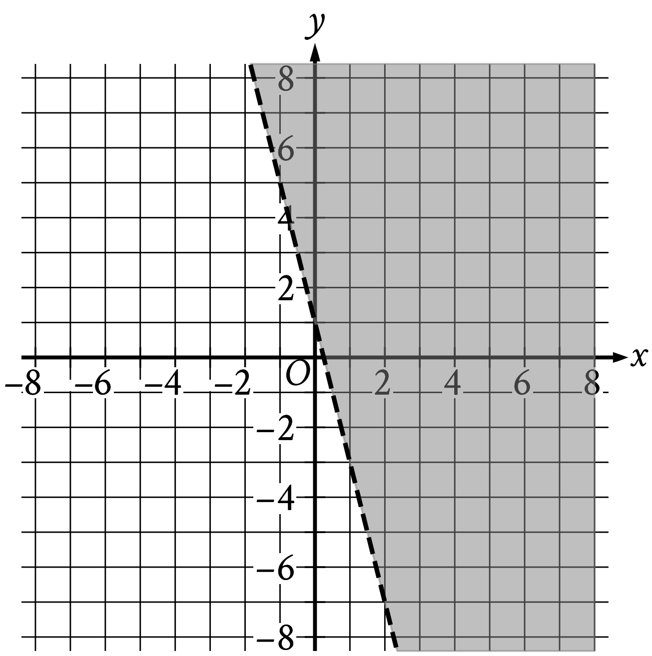
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 36de4720

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 36de4720



The shaded region shown represents the solutions to which inequality?

A. $y < 1 + 4x$

B. $y < 1 - 4x$

C. $y > 1 + 4x$

D. $y > 1 - 4x$

ID: 36de4720 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 $(1, -3)$. 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 $(1, -3)$ for (x_1, y_1) and (x_2, y_2) in this equation yields $m = \frac{-3-1}{1-0}$, which is equivalent to $m = \frac{-4}{1}$, or $m = -4$. Since the point $(0, 1)$ represents the *y*-intercept, it follows that $b = 1$. Substituting -4 for m and 1 for b in the equation $y = b + mx$ yields $y = 1 - 4x$ 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 $y > 1 - 4x$.

Choice A is incorrect. This inequality represents a region below, not above, a boundary line with a slope of 4, not -4.

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 4, not -4.

Question Difficulty: Medium

Question ID be2f9734

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: be2f9734

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: be2f9734 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: Medium

Question ID d40f805f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: d40f805f

$$y < x$$
$$x < 22$$

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: d40f805f 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: Medium

Question ID 5987c039

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 5987c039

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: 5987c039 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: Medium

Question ID c38b4d1e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: c38b4d1e

$$y < -4x + 4$$

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: c38b4d1e 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: Medium

Question ID 14e393be

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 14e393be

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: 14e393be 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.

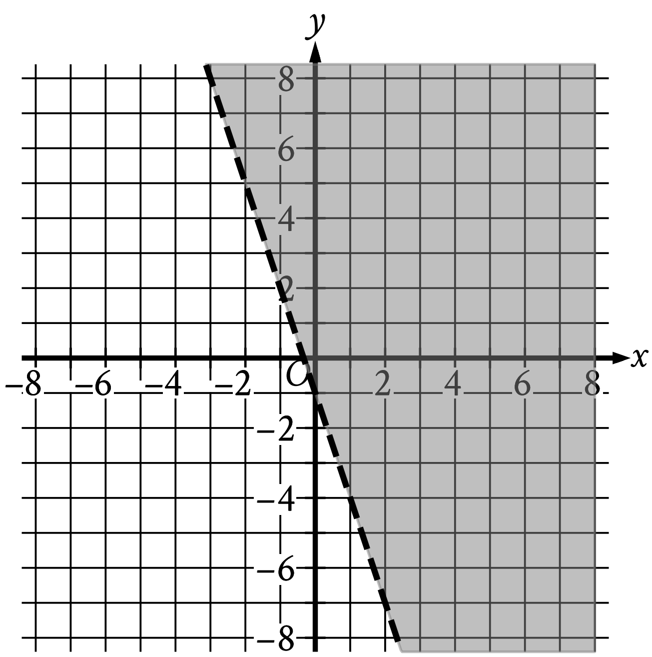
Choice D is incorrect. This inequality represents a situation where 2 times the length, rather than the length, is 50 inches, and the perimeter is at least, rather than at most, 210 inches.

Question Difficulty: Medium

Question ID 5f970630

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 5f970630



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: 5f970630 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: Medium

Question ID 593a32d0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 593a32d0

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: 593a32d0 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: Medium

Question ID 183fe2a0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: 183fe2a0

$$y > 4x + 8$$

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: 183fe2a0 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: Medium

Question ID a2862133

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: a2862133

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: a2862133 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: Medium

Question ID b7677c20

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear inequalities in one or two variables	Medium

ID: b7677c20

$$y > 14$$
$$4x + y < 18$$

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: b7677c20 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: Medium