# Question ID a26fed41

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Easy |

**ID: a26fed41**

On a car trip, Rhett and Jessica each drove for part of the trip, and the total distance they drove was under $220$ miles. Rhett drove at an average speed of $35$ miles per hour $(\text{mph})$, and Jessica drove at an average speed of $40$ mph. Which of the following inequalities represents this situation, where $r$ is the number of hours Rhett drove and $j$ is the number of hours Jessica drove?

A. $35r + 40j > 220$

B. $35r + 40j < 220$

C. $40r + 35j > 220$

D. $40r + 35j < 220$

**ID: a26fed41 Answer**

Correct Answer: B

Rationale

Choice B is correct. It's given that Rhett drove at an average speed of $35$ miles per hour and that he drove for $r$ hours. Multiplying $35$ miles per hour by $r$ hours yields $35r$ miles, or the distance that Rhett drove. It's also given that Jessica drove at an average speed of $40$ miles per hour and that she drove for $j$ hours. Multiplying $40$ miles per hour by $j$ hours yields $40j$ miles, or the distance that Jessica drove. The total distance, in miles, that Rhett and Jessica drove can be represented by the expression $35r + 40j$. It's given that the total distance they drove was under $220$ miles. Therefore, the inequality $35r + 40j < 220$ represents this situation.

Choice A is incorrect. This inequality represents a situation in which the total distance Rhett and Jessica drove was over, rather than under, $220$ miles.

Choice C is incorrect. This inequality represents a situation in which Rhett drove at an average speed of $40$, rather than $35$, miles per hour, Jessica drove at an average speed of $35$, rather than $40$, miles per hour, and the total distance they drove was over, rather than under, $220$ miles.

Choice D is incorrect. This inequality represents a situation in which Rhett drove at an average speed of $40$, rather than $35$, miles per hour, and Jessica drove at an average speed of $35$, rather than $40$, miles per hour.

Question Difficulty: Easy

# 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 84f5f182

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Hard |

**ID: 84f5f182**

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: 84f5f182 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.

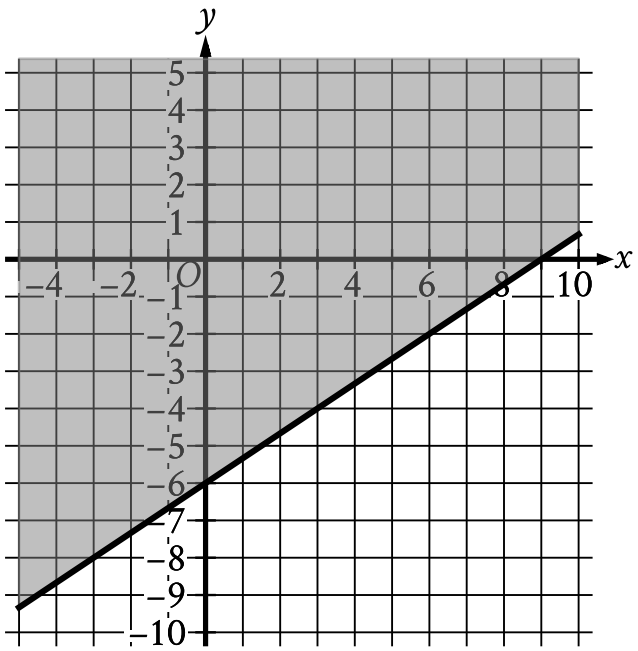
Choice D is incorrect. This inequality represents a situation in which the total earnings are at least $4$ times and at most $5$ times, rather than at least $3$ times and at most $4$ times, the base salary.

Question Difficulty: Hard

# Question ID 741da959

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Easy |

**ID: 741da959**




The shaded region shown represents the solutions to which inequality?

A. $y \geq \frac{2}{3}x - 6$

B. $y \geq \frac{2}{3}x + 6$

C. $y \geq \frac{2}{3}x - 9$

D. $y \geq \frac{2}{3}x + 9$

**ID: 741da959 Answer**

Correct Answer: A

Rationale

Choice A is correct. The equation for the line representing the boundary of the shaded region can be written in slope-intercept form $y = mx + b$, 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 $(0, -6)$ and $(9, 0)$. 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 $(0, -6)$ and $(9, 0)$ for $(x_1, y_1)$ and $(x_2, y_2)$, respectively, in this equation yields $m = \frac{0 - (-6)}{9 - 0}$, which is equivalent to $m = \frac{6}{9}$, or $m = \frac{2}{3}$. Since the point $(0, -6)$ represents the $y$-intercept, it follows that $b = -6$. Substituting $\frac{2}{3}$ for $m$ and $-6$ for $b$ in the equation $y = mx + b$ yields

$y = \frac{2}{3}x - 6$ as the equation of the boundary line. Since the shaded region represents all the points on and above this boundary line, it follows that the shaded region shown represents the solutions to the inequality $y \geq \frac{2}{3}x - 6$.

Choice B is incorrect. This inequality represents a region whose boundary line has a *y*-intercept of $(0, 6)$, not $(0, -6)$.

Choice C is incorrect. This inequality represents a region whose boundary line has a *y*-intercept of $(0, -9)$, not $(0, -6)$.

Choice D is incorrect. This inequality represents a region whose boundary line has a *y*-intercept of $(0, 9)$, not $(0, -6)$.

Question Difficulty: Easy

# 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 46f90b4a

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Hard |

**ID: 46f90b4a**

$$y \leq x + 7$$
$$y \geq -2x - 1$$

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: 46f90b4a 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 bee774f4

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Easy |

**ID: bee774f4**

Ty set a goal to walk at least $24$ kilometers every day to prepare for a multiday hike. On a certain day, Ty plans to walk at an average speed of $4$ kilometers per hour. What is the minimum number of hours Ty must walk on that day to fulfill the daily goal?

A. $4$

B. $6$

C. $20$

D. $24$

**ID: bee774f4 Answer**

Correct Answer: B

Rationale

Choice B is correct. It's given that Ty plans to walk at an average speed of $4$ kilometers per hour. The number of kilometers Ty will walk is determined by the expression $4s$, where $s$ is the number of hours Ty walks. The given goal of at least $24$ kilometers means that the inequality $4s \geq 24$ represents the situation. Dividing both sides of this inequality by $4$ gives $s \geq 6$, which corresponds to a minimum of $6$ hours Ty must walk.

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

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

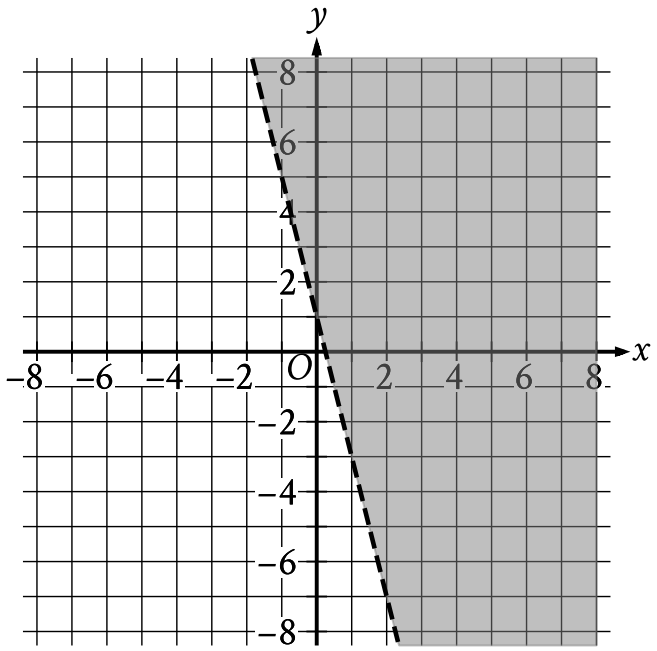
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Easy

# Question ID 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 89f5185f

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Hard |

**ID: 89f5185f**

$$y > 13x - 18$$

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 | 21 |
| 5 | 47 |
| 8 | 86 |

B.

| $x$ | $y$ |
|---|---|
| 3 | 26 |
| 5 | 42 |
| 8 | 86 |

C.

| $x$ | $y$ |
|---|---|
| 3 | 16 |
| 5 | 42 |
| 8 | 81 |

D.

| $x$ | $y$ |
|---|---|
| 3 | 26 |
| 5 | 52 |
| 8 | 91 |

**ID: 89f5185f Answer**

Correct Answer: D

Rationale

Choice D is correct. 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 $y > 13(3) - 18$, or $y > 21$. Therefore, when $x = 3$, the corresponding value of $y$ is greater than $21$. Substituting $5$ for $x$ in the given inequality yields $y > 13(5) - 18$, or $y > 47$. Therefore, when $x = 5$, the corresponding value of $y$ is greater than $47$. Substituting $8$ for $x$ in the given inequality yields $y > 13(8) - 18$, or $y > 86$. Therefore, when $x = 8$, the corresponding value of $y$ is greater than $86$. For the table in choice D, when $x = 3$, the corresponding value of $y$ is $26$, which is greater than $21$; when $x = 5$, the corresponding value of $y$ is $52$, which is greater than $47$; when $x = 8$, the corresponding value of $y$ is $91$, which is greater than $86$. 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. In the table for choice A, when $x = 3$, the corresponding value of $y$ is $21$, which is not greater than $21$; when $x = 5$, the corresponding value of $y$ is $47$, which is not greater than $47$; when $x = 8$, the corresponding value of $y$ is $86$, which is not greater than $86$.

Choice B is incorrect. In the table for choice B, when $x = 5$, the corresponding value of $y$ is $42$, which is not greater than $47$; when $x = 8$, the corresponding value of $y$ is $86$, which is not greater than $86$.

Choice C is incorrect. In the table for choice C, when $x = 3$, the corresponding value of $y$ is $16$, which is not greater than $21$; when $x = 5$, the corresponding value of $y$ is $42$, which is not greater than $47$; when $x = 8$, the corresponding value of $y$ is $81$, which is not greater than $86$.

Question Difficulty: Hard

# Question ID c729c1d7

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Hard |

**ID: c729c1d7**

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: c729c1d7 Answer**

Correct Answer: -14

Rationale

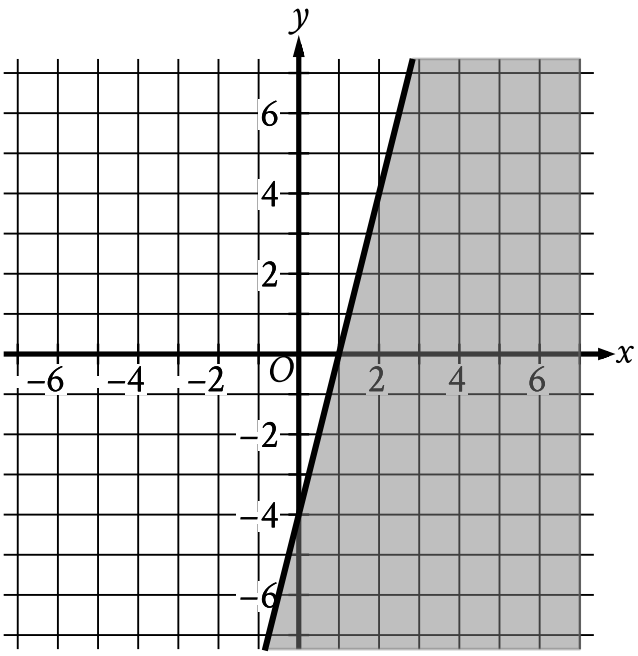
The correct answer is $-14$. It's given that a number $x$ is at most $2$ less than $3$ times the value of $y$. Therefore, $x$ is less than or equal to $2$ less than $3$ times the value of $y$. The expression $3y$ represents $3$ times the value of $y$. The expression $3y - 2$ represents $2$ less than $3$ 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 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 b2d50dc7

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Hard |

**ID: b2d50dc7**

$$y < 6x + 2$$

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 | 20 |
| 5 | 32 |
| 7 | 44 |

B.

| $x$ | $y$ |
|---|---|
| 3 | 16 |
| 5 | 36 |
| 7 | 40 |

C.

| $x$ | $y$ |
|---|---|
| 3 | 16 |
| 5 | 28 |
| 7 | 40 |

D.

| $x$ | $y$ |
|---|---|
| 3 | 24 |
| 5 | 36 |
| 7 | 48 |

**ID: b2d50dc7 Answer**

Correct Answer: C

Rationale

Choice C is correct. 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 $y < 6(3) + 2$, or $y < 20$. Therefore, when $x = 3$, the corresponding value of $y$ is less than $20$. Substituting $5$ for $x$ in the given inequality yields $y < 6(5) + 2$, or $y < 32$. Therefore, when $x = 5$, the corresponding value of $y$ is less than $32$. Substituting $7$ for $x$ in the given inequality yields $y < 6(7) + 2$, or $y < 44$. Therefore, when $x = 7$, the corresponding value of $y$ is less than $44$. For the table in choice C, when $x = 3$, the corresponding value of $y$ is $16$, which is less than $20$; when $x = 5$, the corresponding value of $y$ is $28$, which is less than $32$; when $x = 7$, the corresponding value of $y$ is $40$, which is less than $44$. Therefore, the table in choice C gives values of $x$ and their corresponding values of $y$ that are all solutions to the given inequality.

Choice A is incorrect. In the table for choice A, when $x = 3$, the corresponding value of $y$ is $20$, which is not less than $20$; when $x = 5$, the corresponding value of $y$ is $32$, which is not less than $32$; when $x = 7$, the corresponding value of $y$ is $44$, which is not less than $44$.

Choice B is incorrect. In the table for choice B, when $x = 5$, the corresponding value of $y$ is $36$, which is not less than $32$.

Choice D is incorrect. In the table for choice D, when $x = 3$, the corresponding value of $y$ is $24$, which is not less than $20$; when $x = 5$, the corresponding value of $y$ is $36$, which is not less than $32$; when $x = 7$, the corresponding value of $y$ is $48$, which is not less than $44$.

Question Difficulty: Hard

# Question ID d6a4f60f

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Easy |

**ID: d6a4f60f**

During spring migration, a dragonfly traveled a minimum of $1{,}510$ miles and a maximum of $4{,}130$ miles between stopover locations. Which inequality represents this situation, where $d$ is a possible distance, in miles, this dragonfly traveled between stopover locations during spring migration?

A. $d \leq 1{,}510$

B. $1{,}510 \leq d \leq 4{,}130$

C. $d \geq 4{,}130$

D. $4{,}130 \leq d \leq 5{,}640$

**ID: d6a4f60f Answer**

Correct Answer: B

Rationale

Choice B is correct. It's given that during spring migration, a dragonfly traveled a minimum of $1{,}510$ miles and a maximum of $4{,}130$ miles between stopover locations. It's also given that $d$ represents a possible distance, in miles, this dragonfly traveled between stopover locations. It follows that the inequality $1{,}510 \leq d \leq 4{,}130$ represents this situation.

Choice A is incorrect. This inequality represents a situation in which a dragonfly traveled a maximum of $1{,}510$ miles between stopover locations.

Choice C is incorrect. This inequality represents a situation in which a dragonfly traveled a minimum of $4{,}130$ miles between stopover locations.

Choice D is incorrect. This inequality represents a situation in which a dragonfly traveled a minimum of $4{,}310$ miles and a maximum of $5{,}640$ miles between stopover locations.

Question Difficulty: Easy

# 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 8d93d73a

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Hard |

**ID: 8d93d73a**

$$y < 5x + 6$$

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 | 17 |
| 5 | 27 |
| 7 | 37 |

B.

| $x$ | $y$ |
|---|---|
| 3 | 17 |
| 5 | 35 |
| 7 | 37 |

C.

| $x$ | $y$ |
|---|---|
| 3 | 25 |
| 5 | 35 |
| 7 | 45 |

D.

| $x$ | $y$ |
|---|---|
| 3 | 21 |
| 5 | 31 |
| 7 | 41 |

**ID: 8d93d73a Answer**

Correct Answer: A

Rationale

Choice A is correct. Substituting $3$ for $x$ in the given inequality yields $y < 5(3) + 6$, or $y < 21$. Therefore, when $x = 3$, the

corresponding value of $y$ is less than $21$. Substituting $5$ for $x$ in the given inequality yields $y < 5(5) + 6$, or $y < 31$. Therefore, when $x = 5$, the corresponding value of $y$ is less than $31$. Substituting $7$ for $x$ in the given inequality yields $y < 5(7) + 6$, or $y < 41$. Therefore, when $x = 7$, the corresponding value of $y$ is less than $41$. For the table in choice A, when $x = 3$, the corresponding value of $y$ is $17$, which is less than $21$; when $x = 5$, the corresponding value of $y$ is $27$, which is less than $31$; and when $x = 7$, the corresponding value of $y$ is $37$, which is less than $41$. Therefore, the table in choice A gives values of $x$ and their corresponding values of $y$ that are all solutions to the given inequality.

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 0f93d317

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Easy |

**ID: 0f93d317**

A geologist needs to collect at least $67$ samples of lava from a volcano. If the geologist has already collected $63$ samples from the volcano, what is the minimum number of additional samples the geologist needs to collect?

A. $130$

B. $63$

C. $4$

D. $0$

**ID: 0f93d317 Answer**

Correct Answer: C

Rationale

Choice C is correct. It's given that the geologist has already collected $63$ samples from the volcano. Let $x$ represent the number of additional samples the geologist needs to collect. After collecting $x$ additional samples, the geologist will have collected a total of $63 + x$ samples. It's given that the geologist needs to collect at least $67$ samples. Therefore, $63 + x \geq 67$. Subtracting $63$ from each side of this inequality yields the inequality $x \geq 4$. Thus, the geologist needs to collect a minimum of $4$ additional samples.

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

Choice B is incorrect. This is the number of samples the geologist has already collected, rather than the minimum number of additional samples the geologist needs to collect.

Choice D is incorrect. If the geologist collects $0$ additional samples, the geologist will have collected a total of $63$ samples, which is less than $67$ samples.

Question Difficulty: Easy

# 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 8ac533d5

| Assessment | Test | Domain | Skill | Difficulty |
|---|---|---|---|---|
| SAT | Math | Algebra | Linear inequalities in one or two variables | Hard |

**ID: 8ac533d5**

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: 8ac533d5 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