Practice Test
Linear Inequalities

1

The sum of $120k$ and $215j$ does not exceed 2,500.

Which of the following inequalities represents the statement above?

A) $120k + 215j < 2,500$

B) $120k + 215j > 2,500$

C) $120k + 215j \leq 2,500$

D) $120k + 215j \geq 2,500$

2

One half of a number decreased by 3 is at most -5.

Which of the following inequalities represents the statement above?

A) $\frac{1}{2}n - 3 \leq -5$

B) $3 - \frac{1}{2}n \leq -5$

C) $\frac{1}{2}n - 3 < -5$

D) $3 - \frac{1}{2}n < -5$

3

Which of the following numbers is NOT a solution to the inequality $\frac{3b+5}{-2} \geq b - 8$?

A) 0

B) 1

C) 2

D) 3

4

Which of the following inequalities is equivalent to $0.6(k-7) - 0.3k > 1.8 + 0.9k$?

A) $k < 10$

B) $k < -10$

C) $k > 10$

D) $k > -10$

5

$4m - 3 \leq 2(m+1)$ or $7m + 23 < 15 + 9m$

Which of the following numbers is a solution to the compound inequality above?

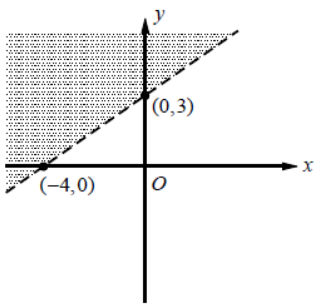
A) 2

B) 3

C) 4

D) 5

6



Which of the following inequalities represents the graph above?

A) $4y - 3x > 12$

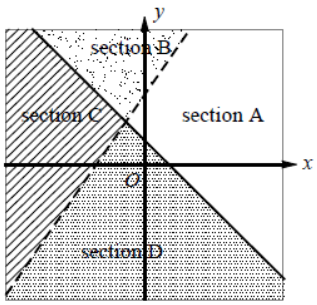
B) $4y - 3x < 12$

C) $3y - 4x > 12$

D) $3y - 4x < 12$

7

$$\begin{cases} 2y - 3x \le 6 \\ y > 1 - x \end{cases}$$



A system of inequalities and a graph are shown above. Which section or sections of the graph could represent all of the solutions to the system?

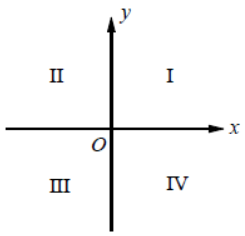
A) Section A

B) Section B

C) Section C

D) Section D

8



If the system of inequalities $3 \ge x$ and $-1 \le y$ is graphed in the xy- plane above, which quadrant contains no solutions to the system?

A) Quadrant II

B) Quadrant III

C) Quadrant IV

D) All four quadrants contain solutions.

9

$$\begin{cases} y < ax + 1 \\ y > bx - 1 \end{cases}$$

In the xy- plane, if $(1, 0)$ is a solution to the system of inequalities above, which of the following must be true?

I. $a > -1$

II. $a + b = 0$

III. $b < 1$

A) I only

B) I and II only

C) I and III only

D) I, II, and III

10

$$\begin{cases} y \ge 12x + 600 \\ y \ge -6x + 330 \end{cases}$$

In the xy- plane, if (x, y) lies in the solution set of the system of inequalities above, what is the minimum possible value of y ?

11

If $-6 \le 3 - 2x \le 9$, what is the greatest possible value of $x - 1$?

12

For what integer value of x is $4x - 2 > 17$ and $3x + 5 < 24$?

Answers
Linear Inequalities

Chapter 4 Practice Test

1. C

$$\underbrace{120k + 215j}_{\substack{\text{the sum of} \\ 120k \text{ and } 215j}} \quad \underbrace{\leq}_{\text{does not exceed}} \quad \underbrace{2,500}_{2,500}$$

2. A

$$\underbrace{\frac{1}{2}n}_{\substack{\text{one half of} \\ \text{a number}}} \quad \underbrace{-3}_{\text{decreased by 3}} \quad \underbrace{\leq}_{\text{is at most}} \quad \underbrace{-5}_{-5}$$

3. D

$$\frac{3b+5}{-2} \geq b-8$$

$-2(\frac{3b+5}{-2}) \leq -2(b-8)$	Multiply each side by -2 and change $\geq$ to $\leq$.
$3b+5 \leq -2b+16$	Simplify.
$3b+5+2b \leq -2b+16+2b$	Add $2b$ to each side.
$5b+5 \leq 16$	Simplify.
$5b+5-5 \leq 16-5$	Subtract 5.
$5b \leq 11$	Simplify.
$\frac{5b}{5} \leq \frac{11}{5}$	Divide each side by 5.
$b \leq \frac{11}{5}$	Simplify.

So, 3 is not a solution to the inequality.

4. B

$$0.6(k-7) - 0.3k > 1.8 + 0.9k$$
$$\Rightarrow \quad 0.6k - 4.2 - 0.3k > 1.8 + 0.9k$$
$$\Rightarrow \quad 0.3k - 4.2 > 1.8 + 0.9k$$
$$\Rightarrow \quad 0.3k - 4.2 - 0.9k > 1.8 + 0.9k - 0.9k$$
$$\Rightarrow \quad -0.6k - 4.2 > 1.8 \quad \Rightarrow \quad -0.6k > 6$$
$$\Rightarrow \quad \frac{-0.6k}{-0.6} < \frac{6}{-0.6} \quad \Rightarrow \quad k < -10$$

Answers
Linear Inequalities

5. A

$4m-3 \le 2(m+1)$ or $7m+25<15+9m$

$4m-3 \le 2m+2$ or $-2m+25<15$

$2m \le 5$ or $-2m<-10$

$m \le \frac{5}{2}$ or $m>5$

Thus, among the answer choices, 2 is the only solution to the compound inequality.

6. A

Slope m of the boundary line is $m=\frac{3-0}{0-(-4)}=\frac{3}{4}$. The y- intercept is 3. So, the slope-intercept form of the line is $y=\frac{3}{4}x+3$.

The standard form of the line is $4y-3x=12$.

Select a point in the shaded region and test each inequality.

Let's use $(0,4)$, as a test point.

A) $4y-3x>12$

$4(4)-3(0)>12$ $\quad x=0,\ y=4$

$16>12$ true

Since the half-plane containing $(0,4)$ is shaded, the test point $(0,4)$ should give a true statement.

Answer choice A is correct.

Choices C and D are incorrect because the equations of the boundary lines are not correct.

7. A

Let's check $(3,0)$, which is in section A.

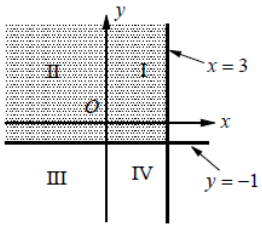
$2(0)-3(3) \le 6$ $\quad x=3,\ y=0$ is true.

$0>1-3$ $\quad x=3,\ y=0$ is true.

Since $x=3$ and $y=0$ are true for both inequalities, section A represents all of the solutions to the system.

8. D

To determine which quadrant does not contain any solution to the system of inequalities, graph the inequalities.



The solution to the system of inequalities is the shaded region shown in the graph above. Its solutions include points in all four quadrants.

D is correct answer.

9. C

$y<ax+1$ and $y>bx-1$

Since $(1,0)$ is a solution to the system of inequalities, substitute $x=1$ and $y=0$ in the given inequalities.

$0<a(1)+1$ and $0>b(1)-1$ $\quad x=1,\ y=0$

$-1<a$ and $1>b$ Simplify.

Statements I and III are true. But we do not know the exact value of a or b, so statement II is not true.

10. 420

$y \ge 12x+600$ First inequality

$y \ge -6x+330$ Second inequality

Multiply each side of the second inequality by 2 and then add it to the first inequality.

$2y \ge -12x+660$ 2nd inequality multiplied by2.

$+\ \ y \ge 12x+600$ First inequality

$3y \ge 1260$ Sum of two inequalities

$\frac{3y}{3} \ge \frac{1260}{3}$ Divide each side by 3.

$y \ge 420$ Simplify.

Therefore, the minimum possible value of y is 420.

11. $\frac{7}{2}$ or 3.5

$-6 \le 3-2x \le 9$

$-6-3 \le 3-2x-3 \le 9-3$ Subtract 3 from each side.

$-9 \le -2x \le 6$ Simplify.

$\frac{-9}{-2} \ge \frac{-2x}{-2} \ge \frac{6}{-2}$ Divide each side by -2 and change $\le$ to $\ge$.

$\frac{9}{2} \ge x \ge -3$ Simplify.

Answers
Linear Inequalities

$\frac{9}{2} - 1 \geq x - 1 \geq -3 - 1$ Subtract 1 from each side.

$\frac{7}{2} \geq x - 1 \geq -4$ Simplify.

The greatest possible value of $x - 1$ is $\frac{7}{2}$.

12. 5 or 6

$4x - 2 > 17$ and $3x + 5 < 24$
$4x > 19$ and $3x < 19$
$x > \frac{19}{4}$ and $x < \frac{19}{3}$

Since x is between $\frac{19}{4} (= 4.75)$ and $\frac{19}{3} (\approx 6.33)$,
the integer value of x is 5 or 6.