SOLUTIONS => Chapter 6 - Chapter Test

MULTIPLE CHOICE

1. Suppose you graph the linear inequality $2x + y < 4$. Which set of statements describes the graph of the linear inequality?

   A. The boundary line is a solid line. The plane is shaded above the line.

   B. The boundary line is a dashed line. The plane is shaded above the line.

   C. The boundary line is a dashed line. The plane is shaded below the line.

   D. The boundary line is a solid line. The plane is shaded below the line.

Equation of boundary: $2x+y=4$

2 points located on the boundary:

x-int:
$2x+0=4$
$\frac{2x}{2}=\frac{4}{2}$
$x=2$

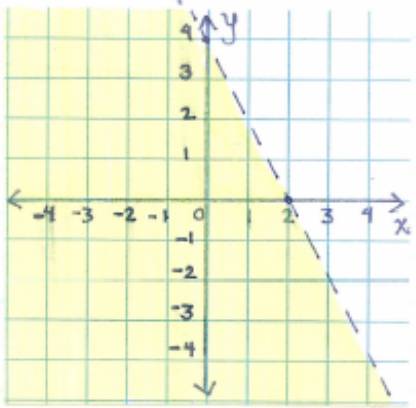
y-int:
$2(0)+y=4$
$y=4$

Test Point; (0,0)

L.S.	R.S.
$2x+y$	4
$2(0)+0$	
0	

$0<4$, therefore (0,0) is located in solution region.

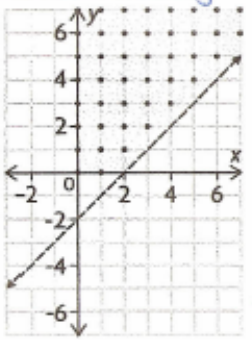
Graph:



Test Point; (0,0)

L.S	R.S.
$y - x$	-2
$0 - 0$	
0	

$0 \geq -2$, (0,0) is located in solution region



2. Which linear inequality is shown in the graph?

A. $\{(x, y) \mid y - x \geq -2, x \in W, y \in W\}$

C. $\{(x, y) \mid y - x \geq -2, x \in R, y \in R\}$

B. $\{(x, y) \mid y - x > -2, x \in W, y \in W\}$

D. $\{(x, y) \mid y - x > -2, x \in I, y \in I\}$

3. Which is a solution to the system of linear inequalities?

$\{(x, y) \mid 2x + y > 5, x \in I, y \in I\}$

$\{(x, y) \mid y - x < 4, x \in I, y \in I\}$

A. (3, 1) B. (4.5, 0) C. (−2, 1) D. (−3, −1)

For (3,1):

L.S.	R.S.
$2x+y$	5
$2(3)+1$	
$6+1$	
7	

✓

L.S	R.S
$y-x$	4
$3-1$	
2	

✓

For (4.5,0):

L.S.	R.S
$2x+y$	5
$2(4.5)+0$	
$9+0$	
9	

✗

L.S.	R.S.
$y-x$	4
$0-4.5$	
-4.5	

✓

For (-2,1):

L.S.	R.S
$2x+y$	5
$2(-2)+1$	
$-4+1$	
-3	

✗

L.S	R.S
$y-x$	4
$1--2$	
3	

✓

For (-3,-1):

L.S.	R.S
$2x+y$	5
$2(-3)-1$	
$-6-1$	
-7	

✗

L.S	R.S.
$y-x$	4
$-1--3$	
2	

✓

4. Consider this system:

$\{(x, y) \mid 3y + x \geq 3, x \in \mathrm{R}, y \in \mathrm{R}\}$

$\{(x, y) \mid x - y < 4, x \in \mathrm{R}, y \in \mathrm{R}\}$

The boundaries for the two inequalities intersect at the point $(3.75, -0.25)$. Which statement about this point is most accurate?

A. The point is not in the solution set, because its coordinates are not whole numbers.

B. The point is in the solution set, because it lies on both boundaries.

C. The point is not in the solution set, because one of the inequality signs is $<$ or $>$.

D. The point is in the solution set, because one of the inequality signs is $\leq$ or $\geq$.

5. A sports equipment manufacturer produces snowboards and skis. It takes 4 h to cut and mould each board and 1 h to put on the finishes. It takes 4 h to cut and mould and 2 h to put on the finishes for a pair of skis. The total number of snowboards and pairs of skis produced per day is at most 15.

Let a represent the number of snowboards and b represent the number of pairs of skis made in one day or less. What are the restrictions on a and b?

A. no restrictions **B.** $a \in \mathrm{N}, b \in \mathrm{N}$ **C.** $a \in \mathrm{I}, b \in \mathrm{I}$ **D.** $a \in \mathrm{W}, b \in \mathrm{W}$

6. Which algebraic model represents the situation in question 5?

A. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 15, a \in \mathrm{R}, b \in \mathrm{R}\}$

$\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathrm{R}, b \in \mathrm{R}\}$

B. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 15, a \in \mathrm{I}, b \in \mathrm{I}\}$

$\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathrm{I}, b \in \mathrm{I}\}$

C. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 15, a \in \mathrm{W}, b \in \mathrm{W}\}$

$\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathrm{W}, b \in \mathrm{W}\}$

D. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 4, a \in \mathrm{N}, b \in \mathrm{N}\}$

$\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathrm{N}, b \in \mathrm{N}\}$

NUMERICAL RESPONSE

7. Consider the inequality $-3x - y \geq -1$.

a) State a point that is a solution to the inequality: (0,1)

b) State a point that is not a solution to the inequality: (1, 0)

Equation of boundary: $-3x-y=-1$

2 points located on the boundary:

x-int:

$-3x-0=-1$

$\frac{-3x}{-3}=\frac{-1}{-3}$

$x=\frac{1}{3}$

$(\frac{1}{3},0)$

y-int:

$-3(0)-y=-1$

$0-y=-1$

$\frac{-y}{-1}=\frac{-1}{-1}$

$y=1$

$(0,1)$

8. Consider this system of linear inequalities:

$y + 3x \geq 9$

$y < 2x - 3$

a) Determine the point of intersection for the system of linear inequalities.

Point of intersection: (2.4, 1.8)

b) Will the point be a solid dot or an open dot on a graph of the system?

A(n) open dot

Equations of the boundaries:

→ $y+3x=9$ → $y=2x-3$

2 points located on each boundary (x-int & y-int):

→ $y+3x=9$

x-int: $0+3x=9$, $\frac{3x}{3}=\frac{9}{3}$, $x=3$

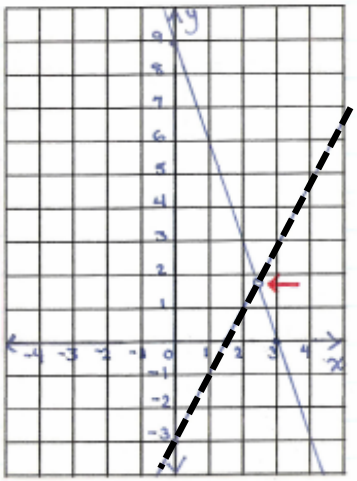
y-int: $y+3(0)=9$, $y=9$

→ $y=2x-3$

x-int: $0=2x-3$, $\frac{3}{2}=\frac{2x}{2}$, $\frac{3}{2}=x$, $1.5=x$

y-int: $y=2(0)-3$, $y=0-3$, $y=-3$

GRAPH (to determine point of intersection):



* Shaded region is not shown.

Point of Intersection located at approx. (2.4, 1.8)