Solutions to Chapter 5 Review #2

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

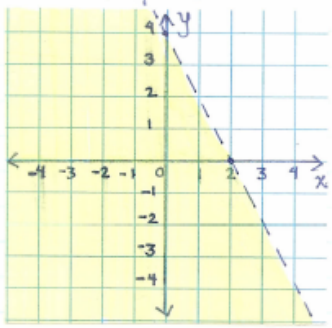
y-int: $2(0)+y=4$, $y=4$

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:



2. 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
1 - 3	
-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	x

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	x

L.S	R.S.
y-x	4
-1-3	
2	✓

3. Consider the system:

$\{(x, y) \mid 3y + x \geq 3, x \in R, y \in R\}$
$\{(x, y) \mid x - y < 4, x \in R, y \in R\}$

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 ≤ or ≥.

4. A sports equipment manufacturer produces snowboards and skis. It takes 4 h to cut and mold each board and 1 h to put on the finishes. It takes 4 h to cut and mold 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 **x** represent the number of snowboards and **y** represent the number of pairs of skis made in one day or less. What are the restrictions on **x** and **y**?

A) No restrictions
B) $x \in N, y \in N$
C) $x \in I, y \in I$
D) $x \in W, y \in W$

5. Consider this system of linear inequalities:

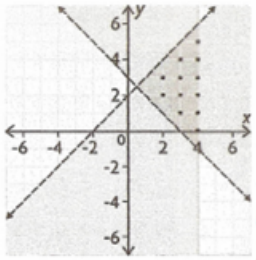
$y + 3x \geq 9$

$y < 2x - 3$

Will the point of intersection on a graph of this system be a solid dot or an open dot? Open Dot

Why?

6. The graph of a system of linear inequalities is shown, where the objective Function is **P = 1.5x + 4y**.



a) Determine the vertices of the feasible region.

(0.5, 2.5), (4, -1), (4, 6)

b) What is the minimum solution for the system? (4, -1)

c) If ***P*** represents the amount of profit, **in thousands of dollars**, what is the minimum profit that can be made? $ 2000

d) What is the maximum solution for the system? (4, 6)

e) If ***P*** represents the amount of profit, **in thousands of dollars**, what is the maximum profit that can be made? $ 30 000

* For (0.5, 2.5): $P = 1.5(0.5) + 4(2.5)$
$P = 0.75 + 10$
$P = 10.75$

For (4, -1): $P = 1.5(4) + 4(-1)$
$P = 6 - 4$
$P = 2$

For (4, 6): $P = 1.5(4) + 4(6)$
$P = 6 + 24$
$P = 30$