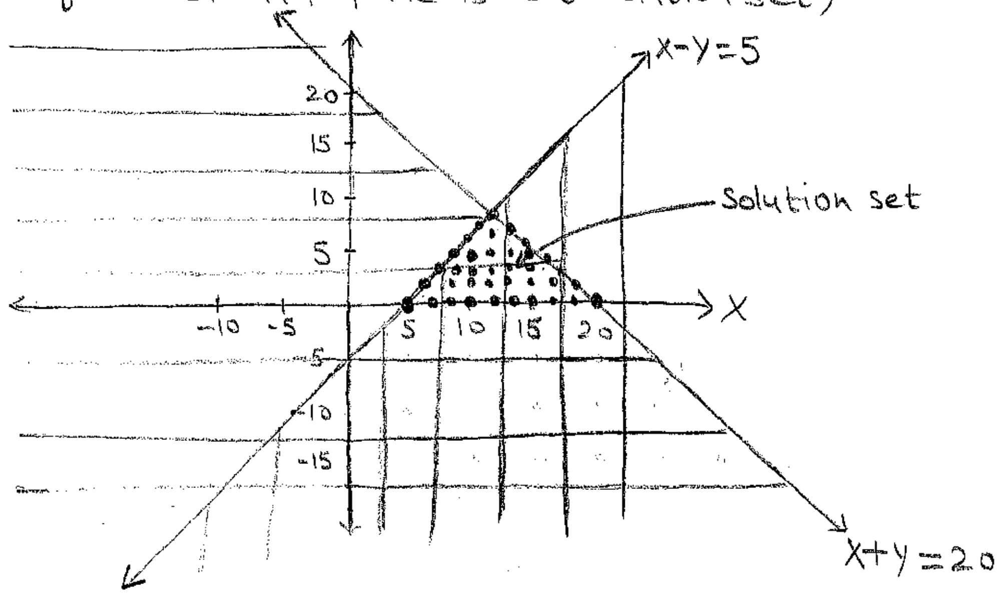
Q.1. Step. 1. Variables $\rightarrow$ x = Number of Adam tractors
y = Number of Nate tractors

Step. 2. Restrictions $\rightarrow$ x & y both are whole numbers $\rightarrow x, y \in W$

Step. 3. Inequalities $\rightarrow$ $x + y \leqslant 20$
$x - y \geqslant 5$

Step. 4. Graph both the inequalities following the process explained in 6.2 (By determining x & y intercepts for each inequality) (And by testing which half plane is the solution set)



Step. 5. Interpretation $\rightarrow$ Each point (with whole number co-ordinates) in the Solution set is a solution. For example, the point (10, 5) is in the solution set. It means company can make 10 Adam tractors and 5 Nate tractors.

Q.2. Step.1. Variables → x = Number of racing cars
y = Number of Sport-utility Vehicles.

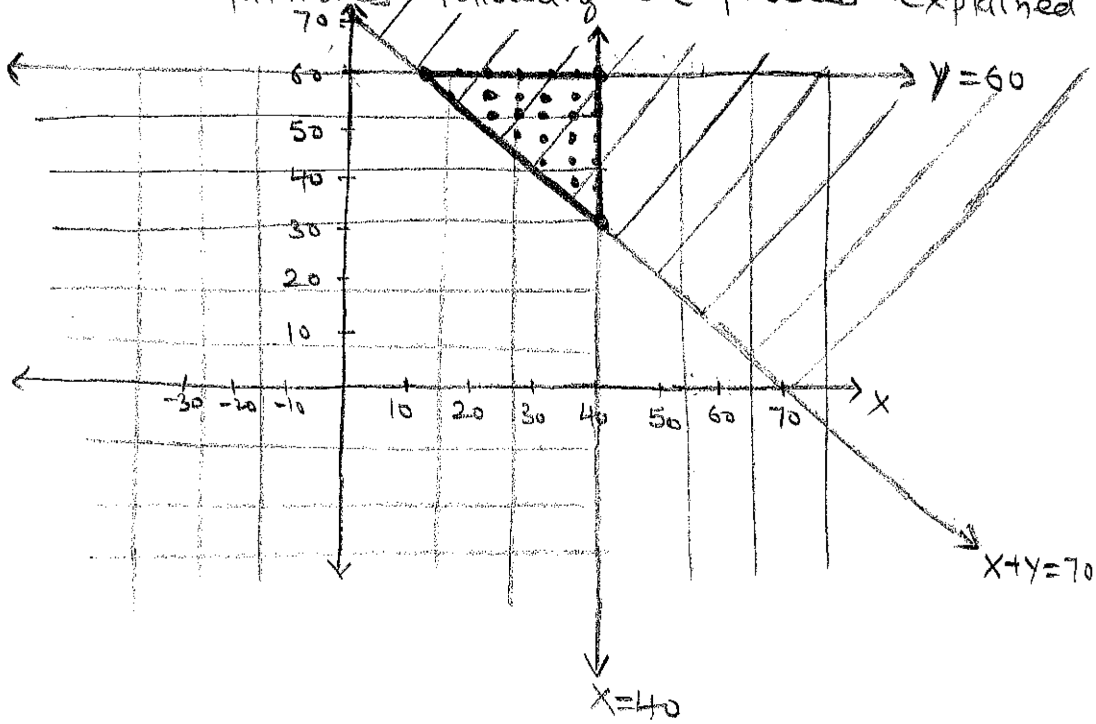
Step. 2. Restrictions → x & y both are whole numbers → x & $y \in W$

Step. 3. Inequalities → $x \leq 40$ (No more than 40 racing cars)

$y \leq 60$ (No more than 60 sports vehicles)

$x + y \geq 70$ (Can make 70 or more vehicles all together)

Step. 4. Graph all three inequalities following the process explained in 6.2



The region where all three inequalities overlap, that is the solution set.

Step 5. Interpretation → Each point (with whole number co-ordinates) in the solution set is a solution. For example, the point (10, 60) is a solution - It means company can 10 racing cars and 60 sports vehicles.

Q.3 Step. 1. Variables → x = Number of School friends

y = Number of Volleyball friends

Step 2. Restrictions → x & y both are whole numbers → $x \& y \in W$

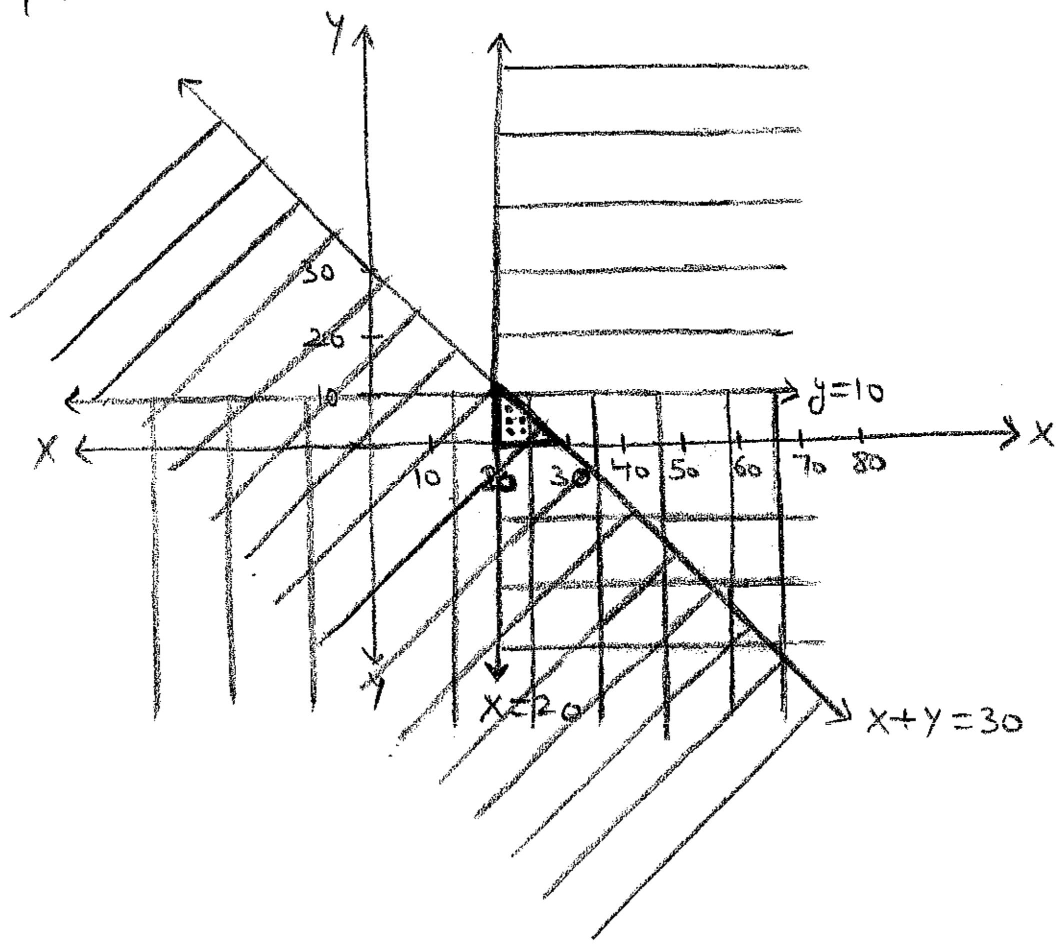
Step 3. Inequalities →

$x \geq 20$ (At least 20 School friends)

$y \leq 10$ (No more than 10 Volleyball friends)

$x + y \leq 30$ (No more than 30 friends all together)

Step. 4. Graph the inequalities.



Step. 5. Interpretation → Trish can have any combination of friends, that falls in the solution set. For example, the point (20,10) is in the solution set, therefore can be one of the combinations.

Q.4. See answer for #6 (P. 318)

6.4

Q.1. <u>Step. 1.</u> Variables → x = number of canadian songs
y = number of American songs

<u>Step. 2.</u> Restrictions → x & y both are whole numbers → $x \, \& \, y \in W$

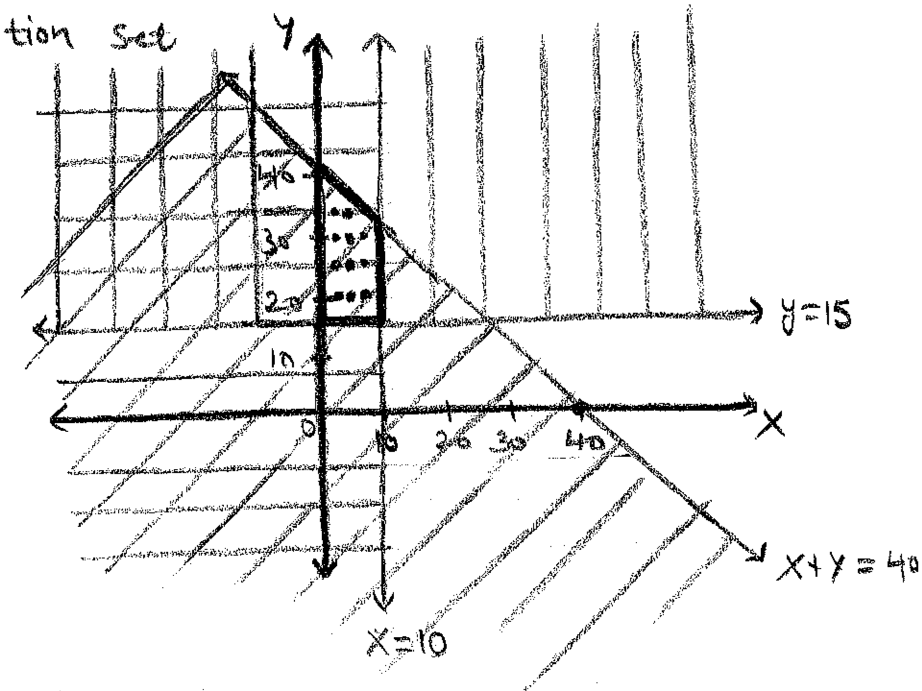
<u>Step. 3.</u> Inequalities →

$x \leq 10$ (10 or fewer Canadian songs)

$y \geq 15$ (15 or more American songs)

$x + y \leq 40$ (40 or fewer songs, in total)

<u>Step. 4.</u> Graph the solution set



<u>Step. 5.</u> Let c represents the cost.
The objective function is

$C = (\$1.50)x + (\$.75)y$

<u>Step. 6.</u> The solution region has four vertices (0,15), (0,40), (10,15), (10,30)

If $(x,y) \to (0,15)$	If $(x,y) \to (0,40)$	If $(x,y) \to (10,15)$	If $(x,y) \to (10,30)$
$C = (\$1.50)(0) + (\$.75)(15)$			
$C = 0 + \$11.25$		$C = 15 + 11.25$	$C = 15 + 22.5$
$C = \$11.25$	$C = \$30$	$C = \$26.25$	$C = \$37.50$

<u>Step 7.</u> Josh can minimize the cost to \$11.25 by downloading zero canadian songs and 15 American songs and maximize cost to \$ 37.50 by downloading 10 canadian and 30 American songs.