Linear Inequations Ex 15.6 Q1(iii)

We have,

$x - y \le 1, \quad x + 2y \le 8, \quad 2x + y \ge 2,$

$x \ge 0$ and $y \ge 0$

Converting the inequations into equations, we obtain

$x - y = 1, \quad x + 2y = 8 \quad 2x + y = 2,$

$x = 0$ and $y = 0.$

Region represented by $x - y \le 1$:
Putting $x = 0$ in $x - y = 1$,
we get $y = -1$
Putting $y = 0$ in $x - y = 1$,
we get $x = 1$

$\therefore$ The line $x - y = 1$ meets the coordinate axes at $(0, -1)$ and $(1,0)$. Draw a thick line joining these points.
Now, putting $x = 0$ and $y = 0$ in $x - y \le 1$
in $x - y \le 1$, we get, $0 \le 1$

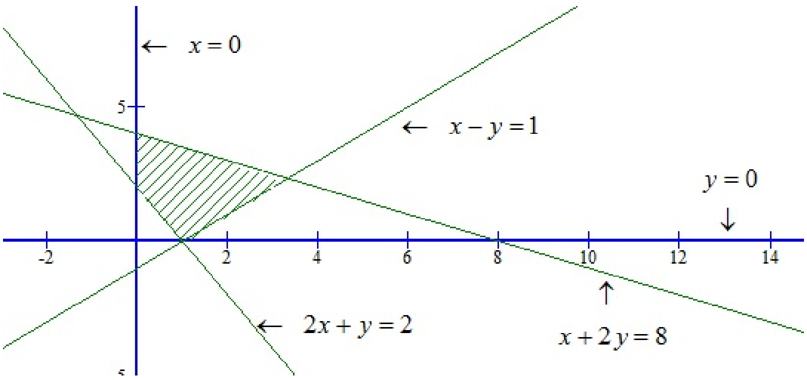
Clearly, we find that $(0,0)$ satisfies inequation $x - y \le 1$
Region represented by $x + 2y \le 8$:
Putting $x = 0$ in $x + 2y = 8$,
we get, $y = \frac{8}{2} = 4$
Putting $y = 0$ in $x + 2y = 8$,
we get $x = 8$,

$\therefore$ The line $x + 2y = 8$ meets the coordinate axes at $(8,0)$ and $(0,4)$. Draw a thick line joining these points.
Now, putting $x = 0$, $y = 0$
in $x + 2y \le 8$, we get $0 \le 8$

Clearly, we find that $(0,0)$ satisfies inequation $x + 2y \le 8$.

Region represented by $2x + y \ge 2$
Putting $x = 0$ in $2x + y = 2$, we get $y = 2$
Putting $y = 0$ in $2x + y = 2$, we get $x = \frac{2}{2} = 1$.

The line $2x + y = 2$meets the coordinate axes at $(0,2)$ and $(1,0)$. Draw a thick line joining these points.



Linear Inequations Ex 15.6 Q1(iv)

We have,

$x + y \geq 1, \quad 7x + 9y \leq 63, \quad x \leq 6,$

$y \leq 5 \quad x \geq 0$ and $y \geq 0$

Converting the inequations into equations, we obtain

$x + y = 1, \quad 7x + 9y = 63 \quad x = 6,$

$y = 5, \quad x = 0$ and $y = 0.$

Region represented by $x + y \geq 1$:
Putting $x = 0$ in $x + y = 1$, we get $y = 1$
Putting $y = 0$ in $x + y = 1$, we get $x = 1$

$\therefore$ The line $x + y = 1$ meets the coordinate axes at $(0,1)$ and $(1,0)$. join these point by a thick line.

Now, putting $x = 0$ and $y = 0$ in $x + y \geq 1$, we get $0 \geq 1$
This is not possible

$\therefore$ $(0,0)$ is not satisfies the inequality $x + y \geq 1$. So, the portion not containing the origin is represented by the inequation $x + y \geq 1$.

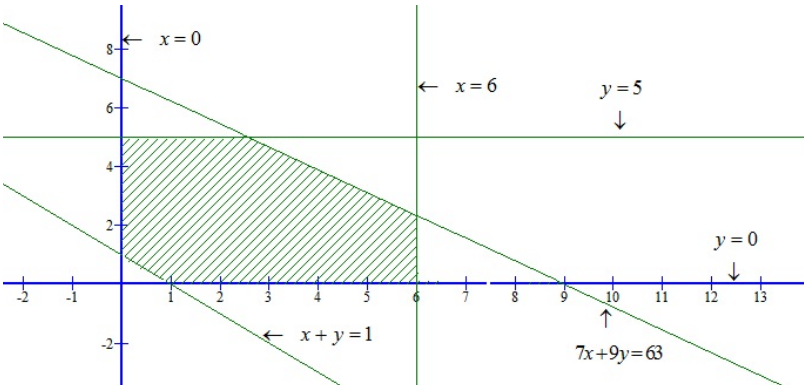
Region represented by $7x + 9y \leq 63$:
Putting $x = 0$ in $7x + 9y = 63$, we get, $y = \frac{63}{9} = 7$.
Putting $y = 0$ in $7x + 9y = 63$, we get $x = \frac{63}{7} = 9$.
$\therefore$ The line $7x + 9y = 63$ meets the coordinete axes of $(0,7)$ and $(9,0)$. Join these points by a thick line.
Now, putting $x = 0$ and $y = 0$
in $7x + 9y \leq 63$, we get, $0 \leq 63$

$\therefore$ we find $(0,0)$ satisfies the inequality $7x + 9y \leq 63$. So, the portion containing the origin represents the solution set of the inequation $7x + 9y \leq 63$.

Region represented by $x \leq 6$: Clearly, $x = 6$ is a line parallel to y-axis at a distance of 6 units from the origin. Since $(0,0)$ satisfies the inequation $x \leq 6$. so, the portion lying on the left side of $x = 6$ is the region represented by $x \leq 6$.

Region represented by $y \leq 5$: Clearly, $y = 5$ is a line parallel to x-axis at a distance 5 from it. since $(0,0)$ satisfies by the given inequation.
Region represented by $x \geq 0$ and $y \geq 0$: clearly, $x \geq 0$ and $y \geq 0$ represent the first quadrant.

The common region of the above six regions represents the solution set of the given inequation as shown below.



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