Linear Inequations Ex 15.6 Q1(v)

We have,

$2x + 3y \le 35, \quad y \ge 3, \quad x \ge 2, \quad x \ge 0$ and $y \ge 0$

Converting the inequations into equations, we get

$2x + 3y = 35, \quad y = 3, \quad x = 2, \quad x = 0$ and $y = 0$.

Region represented by $2x + 3y \le 35$:

Putting $x = 0$ in $2x + 3y = 35$, we get $y = \frac{35}{3}$

Putting $y = 0$ in $2x + 3y = 35$, we get $x = \frac{35}{2}$

$\therefore$ The line $2x + 3y = 35$ meets the coordinate axes at $\left(0, \frac{35}{3}\right)$ and $\left(\frac{35}{2}, 0\right)$. joining these point by a thick line.

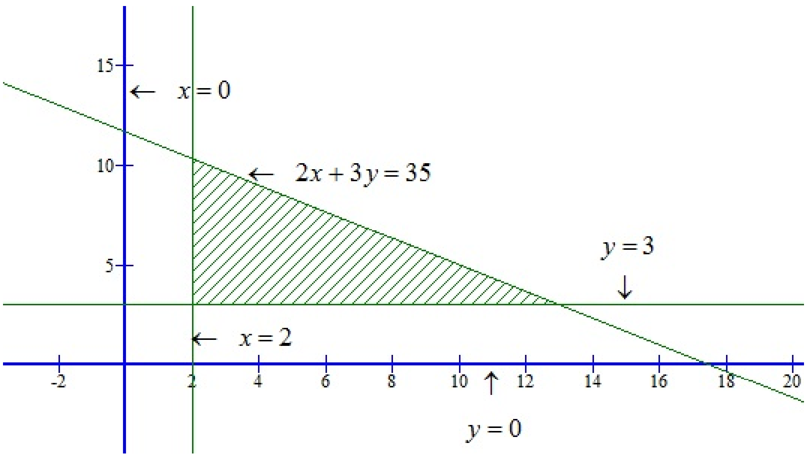
Now, putting $x = 0$ and $y = 0$ in $2x + 3y \le 35$, we get $0 \le 35$.
Clearly, $(0,0)$ satisfies the inequality $2x + 3y \le 35$. So, the portion containing the origin represents the solution $2x + 3y \le 35$.

Region represented by $y \ge 3$:
Clearly, $y = 3$ is a line parallel to x-axis at a distance 3 units from the origin. Since $(0,0)$ does not satisfies the inequation $y \ge 3$.
So, the portion not containing the origin is represented by the $y \ge 3$.

Region represented by $x \ge 2$
Clearly, $x = 2$ is a line parallel to y-axis at a distance of 2 units from the origin. Since $(0,0)$ does not satisfies the inequation $x \ge 2$. so, the portion not containing the origin is represented by the given inequation.

Region represented by $x \ge 0$ and $y \ge 0$: clearly, $x \ge 0$ and $y \ge 0$ represent the first quadrant.

The common region of the above five regions represents the solution set of the given inequations as shown below.



Linear Inequations Ex 15.6 Q2(i)

We have,

$x - 2y \geq 0, \quad 2x - y \leq -2, \quad x \geq 0$ and $y \geq 0$

Converting the inequations into equations, we get

$x - 2y = 0, \quad 2x - y = -2, \quad x = 0$ and $y = 0$.

Region represented by $x - 2y \geq 0$:
Putting $x = 0$ in $x - 2y = 0$, we get $y = 0$
Putting $y = 2$ in $x - 2y = 0$, we get $x = 4$

$\therefore$ The line $x - 2y = 0$ meets the coordinate axes at $(0,0)$. joining these point $(0,0)$ and $(4,2)$ by a thick line.

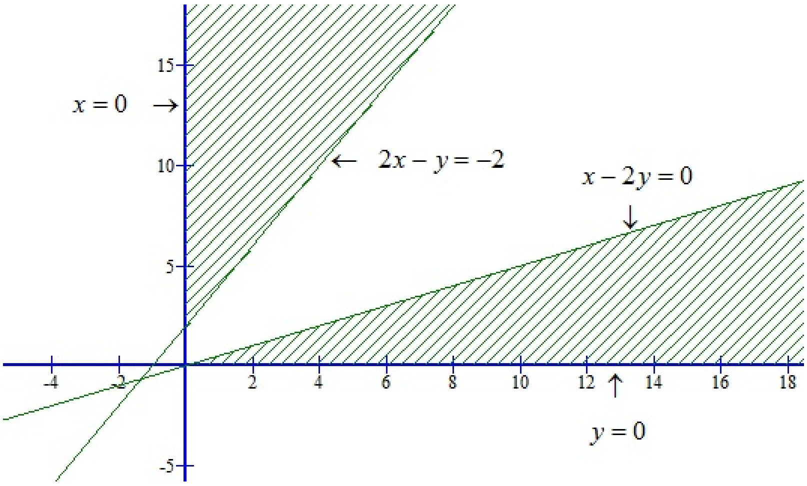
Now, putting $x = 0$ and $y = 0$ in $x - 2y \geq 0$, we get $0 \geq 0$.
Clearly, we find that $(0,0)$ satisfies the inequation $x - 2y \geq 0$. So, the portion containing the origin is represented by the given inequation.

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

$\therefore$ The line $2x - y = -2$ meets the coordinate axes of $(0,2)$ and $(-1,0)$. Joining these points by a thick line.

Now, putting $x = 0$ and $y = 0$ in $2x - y \leq -2$, we get $0 \leq -2$ This is not possible.
Since, $(0,0)$ does not satisfy the portion inequation $2 - y \leq -2$. So, the portion not containing the origin is represented by the inequation $2x - y \leq -2$.

Region represented by $x \geq 0$ and $y \geq 0$: Clearly, $x \geq 0$ and $y \geq 0$ represented the first quadrant.



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