Linear Inequations Ex 15.6 Q4

Consider the line $x+y=4$. we observe that the shaded region and the origin are on the same side of the line $x+y=4$ and $(0,0)$ satisfies the linear inequation $x+y\le 4$. So, we must have one inequations as $x+y\le 4$

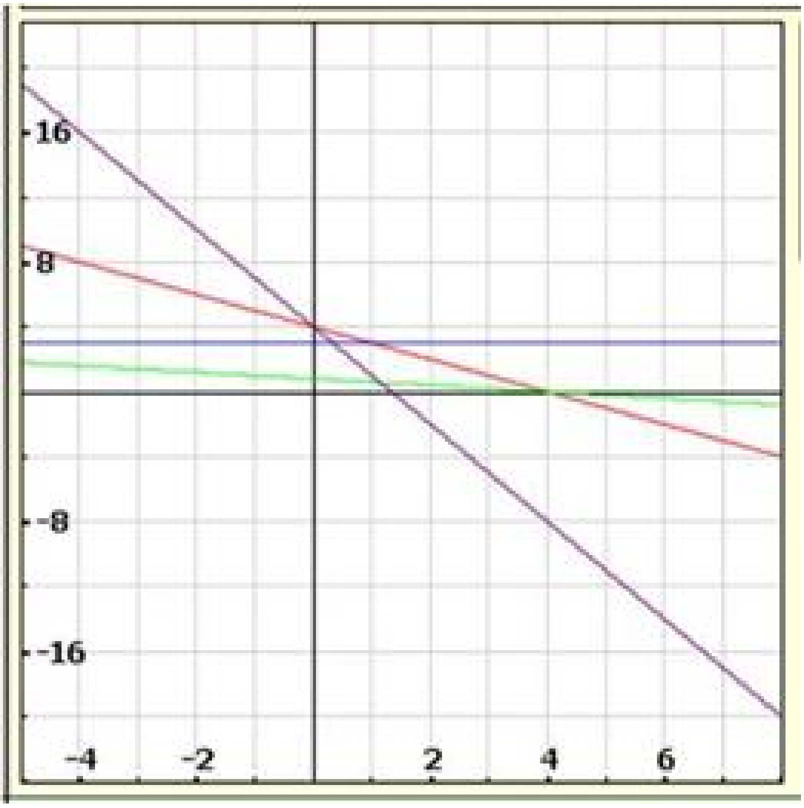
Consider the line $y=3$. we observe that the shaded region and the origin are on the same side of the line $y=3$ and $(0,0)$ satisfies the linear inequation $y\le 3$. so, the second inequations is $y\le 3$.

Consider the line $x=3$.
We observe that the shaded region and the origin are on the same side of the line $x=3$ and $(0,0)$ satisfies the linear inequation $x\le 3$. so, the third inequations is $x\le 3$.

Consider the line $x+5y=4$. we observe that the shaded region and the origin are on the opposite sides of the line $x+5y=4$ and $(0,0)$ does not satisfy the inequation $x+5y\ge 4$. so, the fourth inequations is $x+5y\ge 4$.

Finaly, consider the line $6x+2y=8$. we observe that the shaded region and the origin are on the opposite sides of the $6x+2y=8$ and $(0,0)$ does not satisfy the inequation $6x+2y=8$.
so the fifth inequations is $6x+2y=8$,
we also, notice that the shaded region is above x-axis and is on the right side of y-axis. so, we must have $x\ge 0$ and $y\ge 0$

Thus, the ilnear inequations corresponding to the given solution set are
$x+y\le 4,\quad y\le 3,\quad x\le 3,\quad x+5y\ge 4,\ 6x+2y\ge 8,\quad x\ge 0,\ y\ge 0.$



Linear Inequations Ex 15.6 Q5

We have,
$x + y \le 9,\ \ 3x + y \ge 12,\ x \ge 0$ and $y \ge 0$

Converting the inequations into equations, we get
$x + y = 9,\ \ 3x + y = 12,\ x = 0$ and $y = 0.$

Region represented by $x + y \ge 9$:
Putting $x = 0$ in $x + y = 9$, we get $y = 9$.
Putting $y = 0$ in $x + y = 9$, we get $x = 9$.

$\therefore$ The line $x + y = 9$ meets the coordinat axes at $(0,9)$ and $(9,0)$. Join these points by a thick line.

Now, putting $x = 0$ and $y = 0$ in $x + y \ge 9$, we get $0 \ge 9$ This is not possible.
$\therefore$ We find that $(0,0)$ is not satisfies the inequation $x + y \ge 9$.
So, the portion not containing the origin is represented by the given inequation.

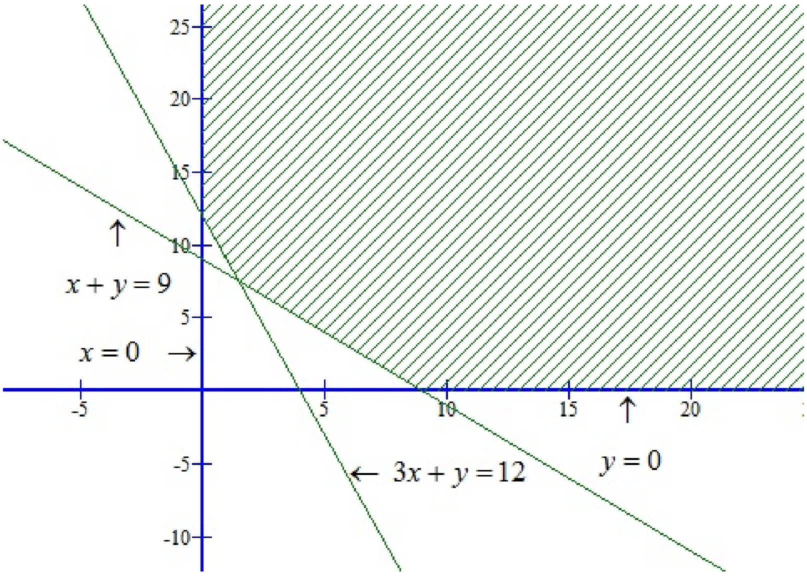
Region represented by $3x + y \ge 12$:
Putting $x = 0$ in $3x + y = 12$, we get $y = 12$
Putting $y = 0$ in $3x + y = 12$, we get $x = \frac{12}{3} = 4$.

$\therefore$ The line $3x + y = 12$ meets the coordinate axes at $(0,12)$ and $(4,0)$. Joining these points by a thick line.
Now, putting $x = 0$ and $y = 0$ in $3x + y \ge 12$, we get, $0 \ge 12$

This is not possible.

$\therefore$ we find that $(0,0)$ is not satisfies the inequation $3x + y \ge 12$. 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.



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