

Q: Solve the following linear programming problems geometrically.

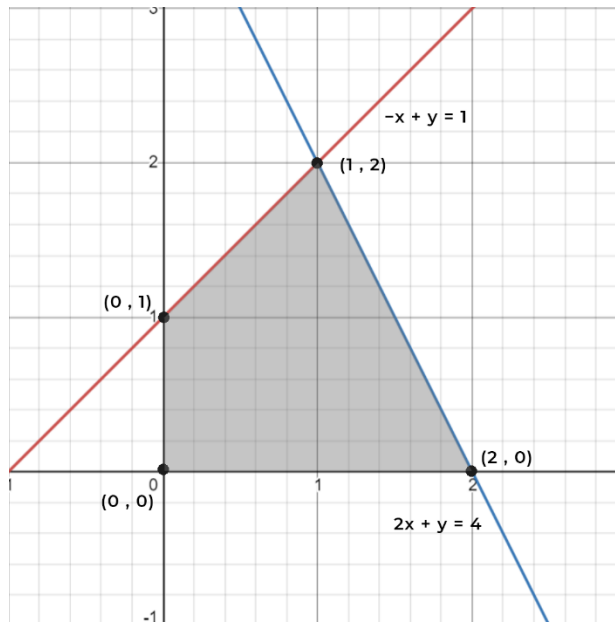
a. maximize $3x + y$
 subject to $-x + y \leq 1$
 $2x + y \leq 4$
 $x \geq 0, y \geq 0$

b. maximize $x + 2y$
 subject to $4x \geq y$
 $y \leq 3 + x$
 $x \geq 0, y \geq 0$

A:

a. Let $y = 0$ Let $x = 0$
 $-x + 0 \leq 1$ $0 + y \leq 1$
 $x \leq -1$ $y \leq 1$

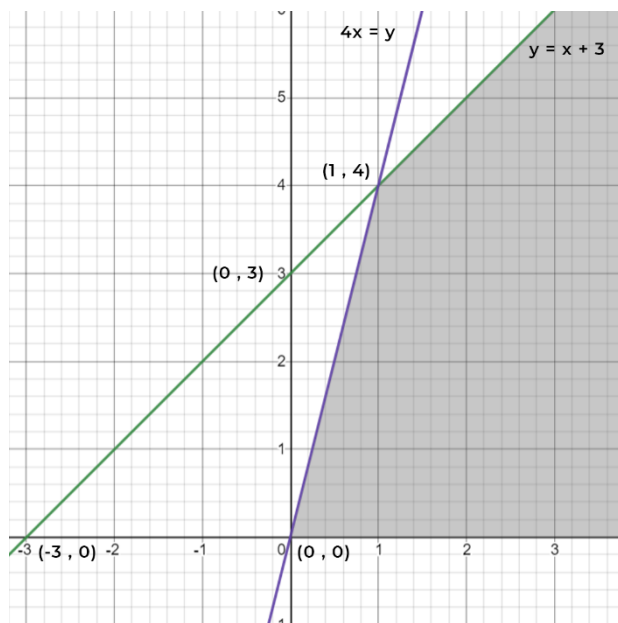
$2x + 0 \leq 4$ $0 + y \leq 4$
 $2x \leq 4$ $y \leq 4$
 $x \leq 2$



x	y	$3x + y$
0	0	0
0	1	1
2	0	6
1	2	5

$\therefore 3x + y$ is maximized when $x = 2$ and $y = 0$, with objective function value equal to 6

b. Let $y = 0$	Let $x = 0$
$4x \geq 0$	$0 \geq y$
$x \geq 0$	$y \geq 0$
$0 \leq 3 + x$	$y \leq 3$
$x \geq -3$	



The problem is unbounded, therefore there is no finite optimal solution.