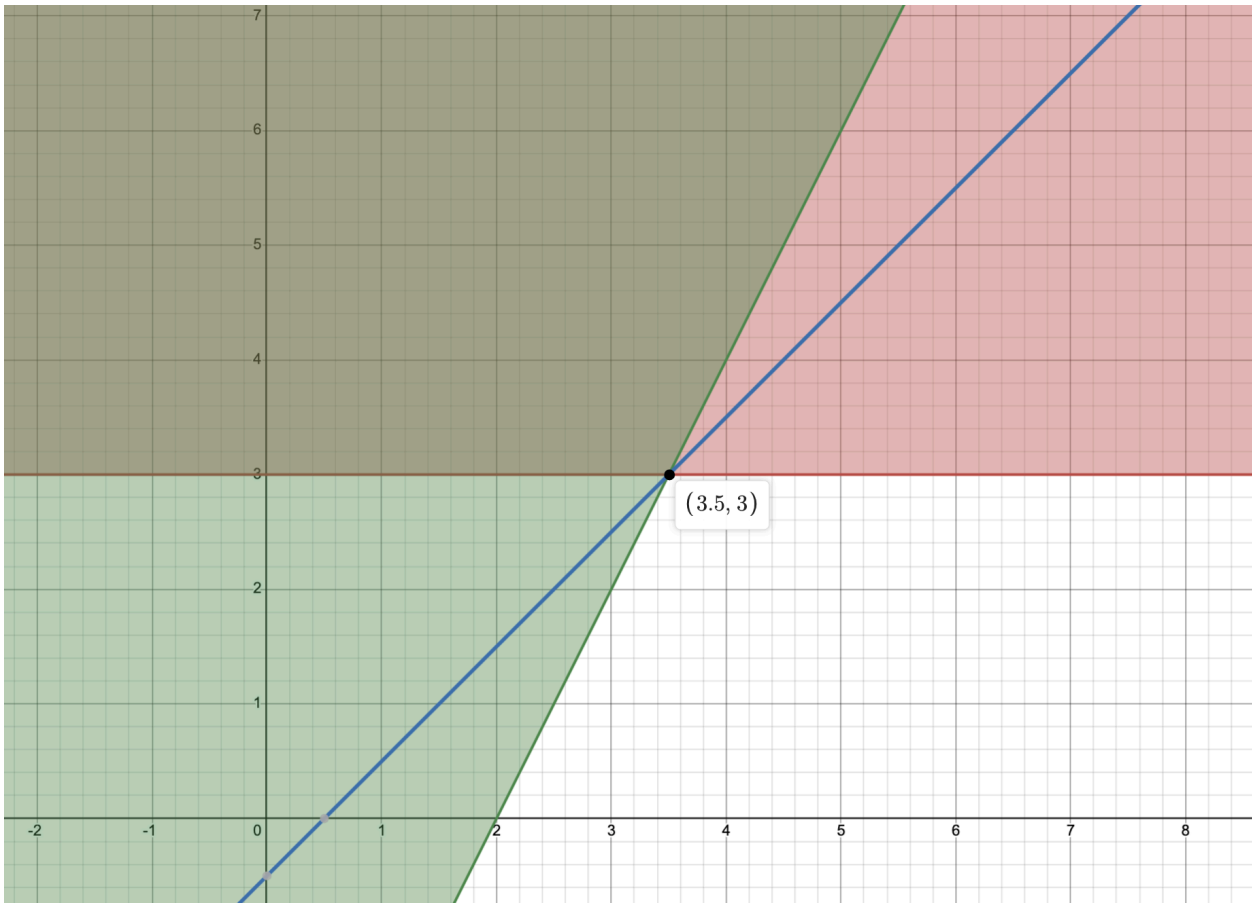
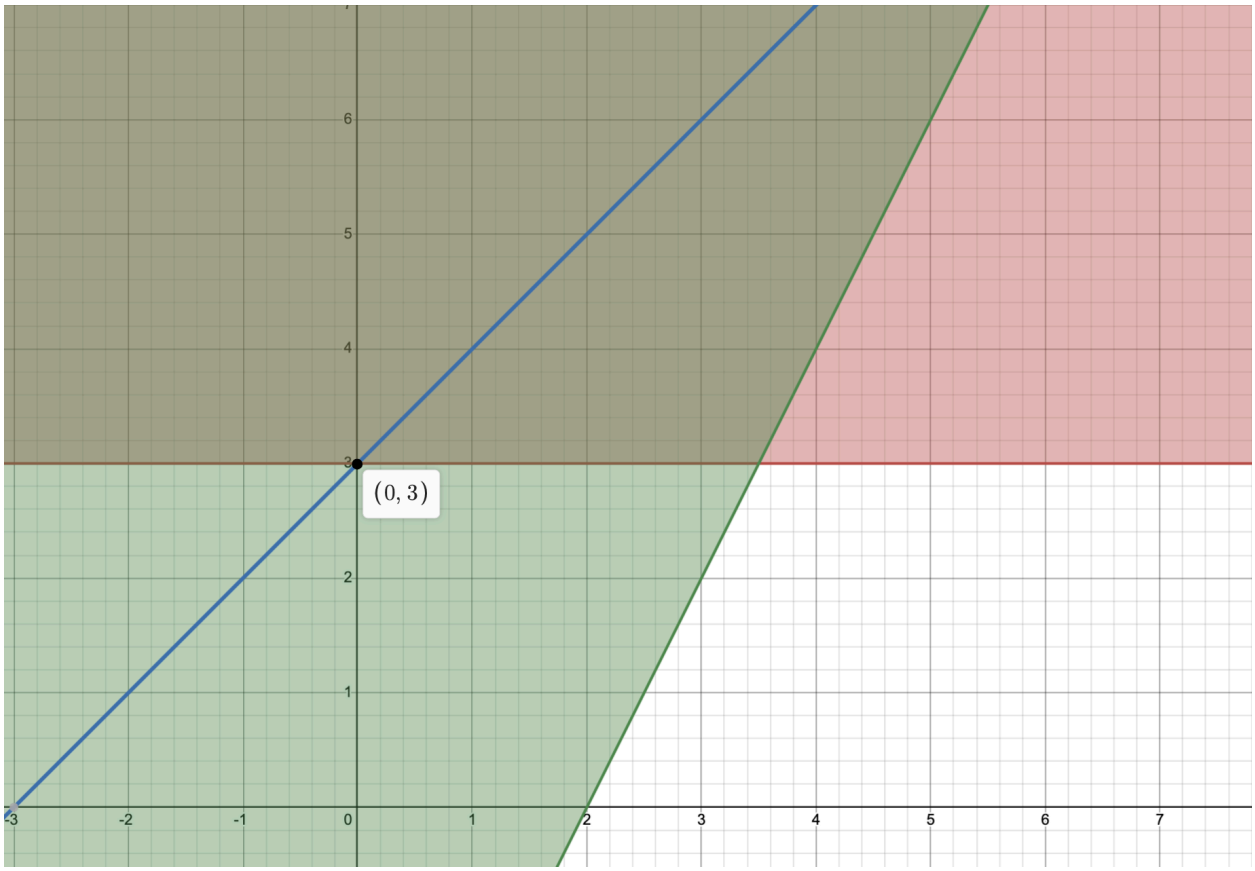


(a) The optimal solution for this linear program is when $x_1 = 3.5$ and $x_2 = 3$ with the objective function value being -0.5

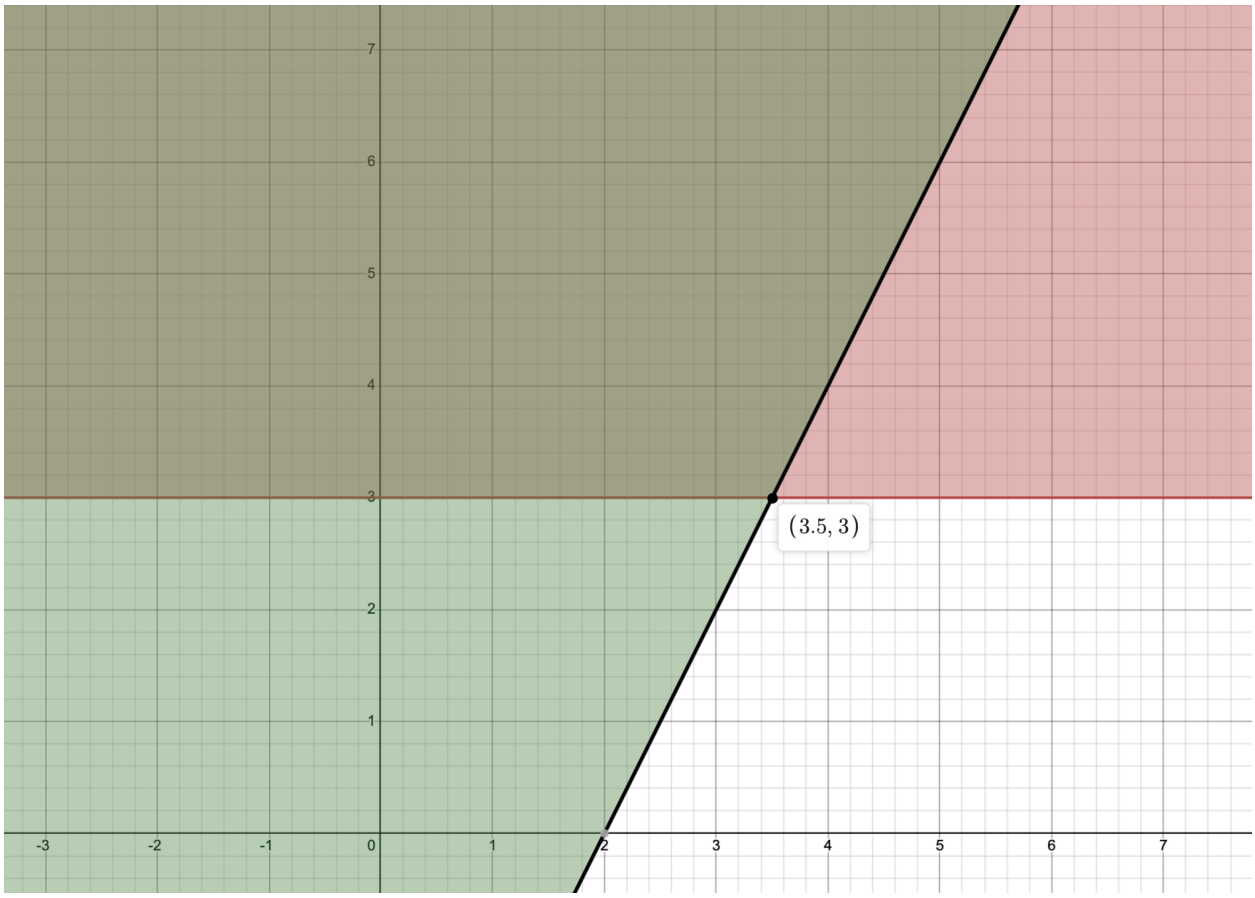
(b) This linear program has exactly one optimal solution.

(c)



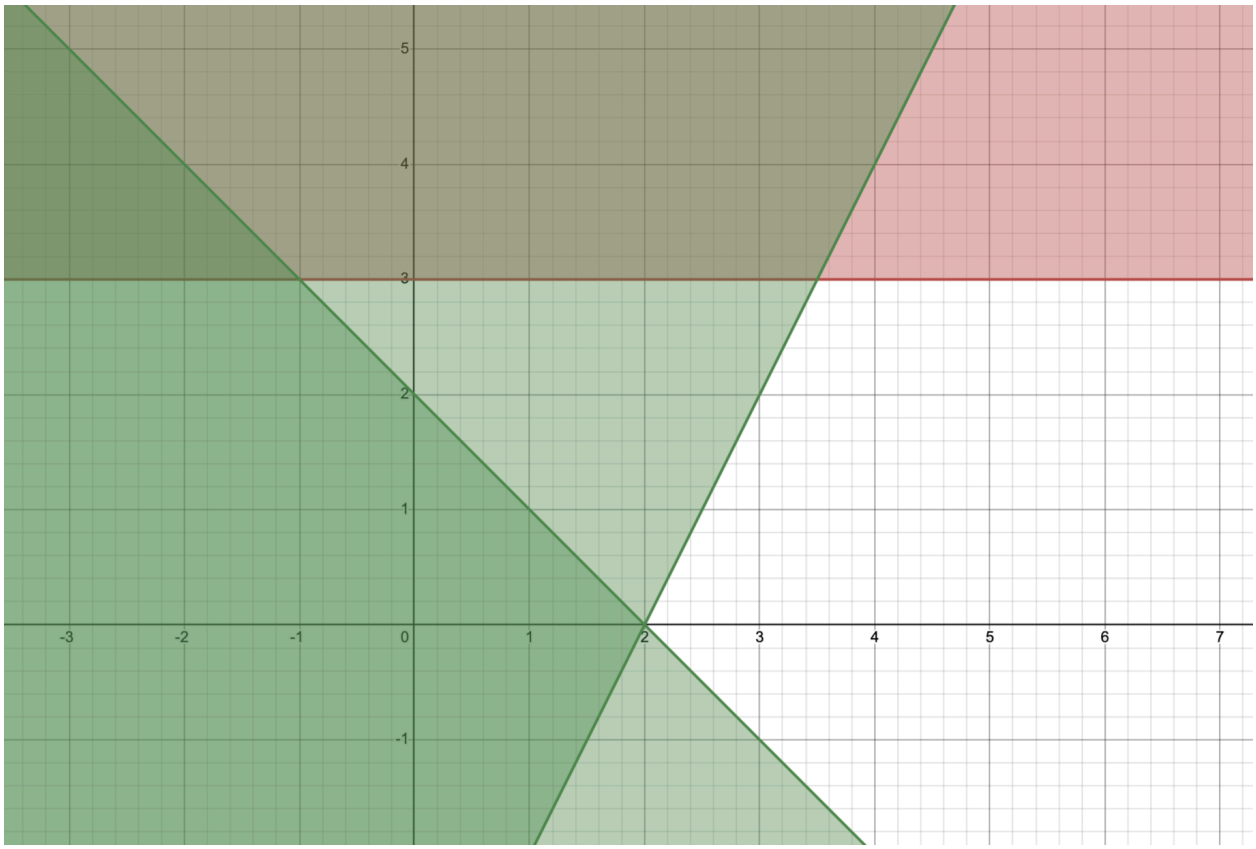
The optimal solution for this linear program is $x_1 = 0$ and $x_2 = 3$ with the objective function value being 3

There is exactly one optimal solution for part (c)

(d) 

The optimal solution for this linear program is $x_1 = 3.5$ and $x_2 = 3$ with the objective function value being -4
There is exactly one optimal solution in this case as well.

(e) $x_1 + x_2 \leq 2$ could be one of the constraints that can make this model infeasible. Here is how:



The intersection of these three polyhedrons will not satisfy all the constraints.