XYZ company manufactures filtered and unfiltered bottle waters. The amount of profit is $18 for one filtered water bottle, and it is $10 for unfiltered water bottle. The time in minutes it takes to manufacture and package each type is shown in the table below:

	Filtered	**Unfiltered**
Manufacture	12	6
Package	8	2

The company has at most 40 hours a week available in the manufacturing department and at most 20 hours a week available in the packaging department. The objective is to find the number of water bottles of each type to be produced to get the maximize profit?

a) Formulate the LP problem above.

b) Solve the problem by finding the Maximum profit (show the work)

Answer)

	Manufacture (2400)	Package (1200)	Profit $
Filtered bottle	12	8	18
Unfiltered bottle	6	2	10

Objective evaluation / profit:

P= 18x + 10y

Constraints:

12x + 6y <= 2400 (Manufacturing)

8x + 2y <= 1200 (Packaging)

Solving for first constraint.

12x + 6y = 2400

When y = 0	When x = 0
12x = 2400	6y = 2400
x = 2400/12	y = 2400/6
x = 200	y = 400

Solving for second constraint.

$8x + 2y = 1200$

When y = 0	When x = 0
$8x = 1200$	$2y = 1200$
$x = 1200/8$	$y = 1200/2$
$x = 150$	$y = 600$

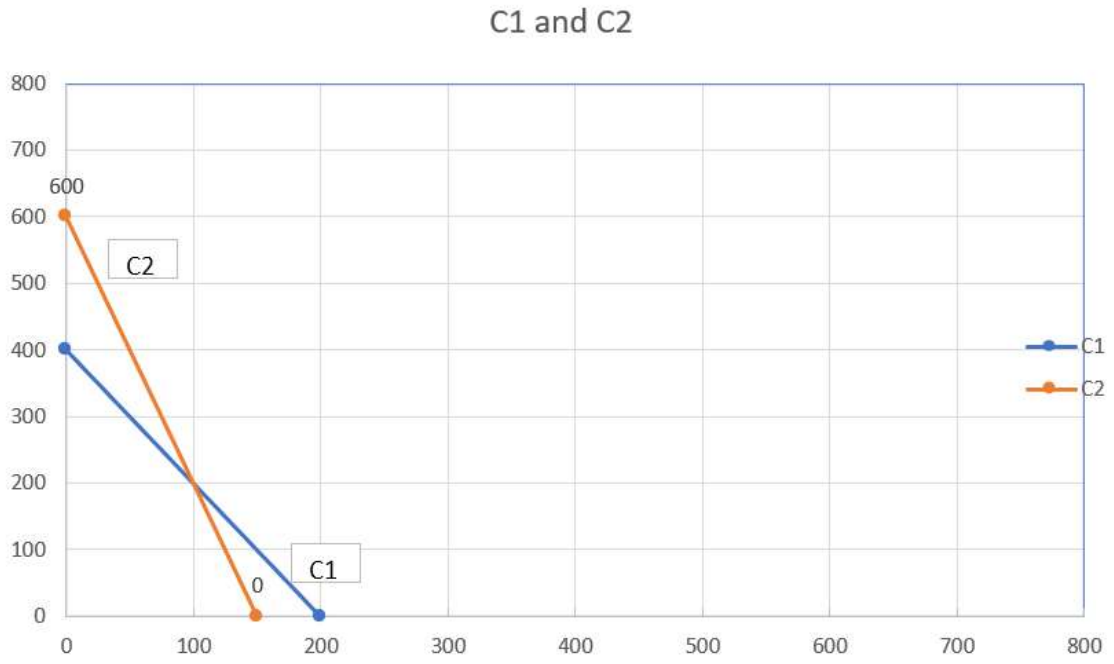
For C1:

X	Y
200	0
0	400

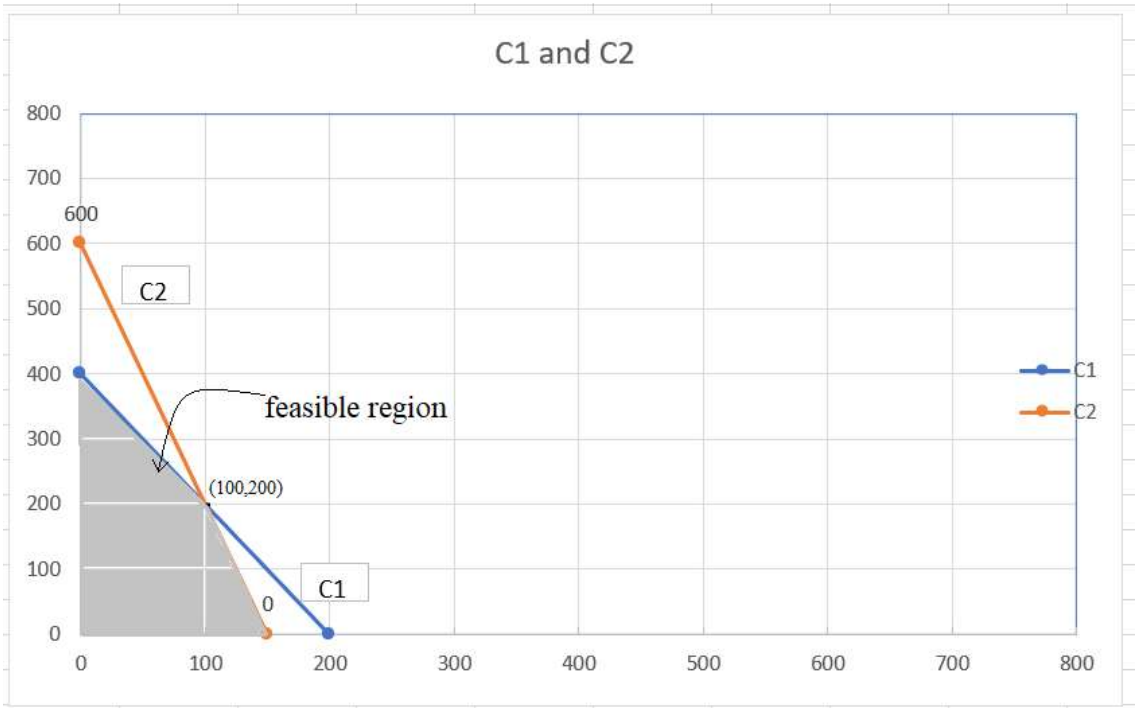
For C2:

X	Y
150	0
0	600

We get the following graph.



The feasible region:



Using corner point principle.

POINT	P= 18x + 10y	PROFIT
(0,0)	18(0) + 10(0)	$0
(0, 400)	18(0) + 10(400)	$4000
(150, 0)	18(150) + 10(0)	$2700
(100, 200)	18(100) + 10(200)	$ 3800

Optimal solution is 0 filtered bottles and 400 un-filtered bottles for maximum profit.