Graphical Solution of LPP

⇒ **Solution** :- An n-tuple $(x_1, x_2, \ldots x_n)$ of real number which satisfies the constraints of a general linear programming problem is called a solution of the general LPP.

⇒ **Feasible Solution** :- Any solution to a general LPP which also satisfies the non negative restrictions of the problem is called a feasible solution to the general LPP.

⇒ **Optimum Solution** :- Any feasible solution which optimize (minimize or maximize) the objective function of a general LPP is called an optimum solution of general LPP.

Graphical Solution of LPP

Step 1 :- Identify the problem the decision variables, the objective and the restrictions

Step 2 :- Setup the mathematical formulation of the problem.

Step 3 :- Plot a graph representing all the constraints of the problem and identify feasible reason (solution space)

The feasible reason is the intersection of all the reasons represented by the constraints of the problem and is restricted to the first quadrant only.

Step 4: The feasible reason obtained in Step 3 may be bounded or unbounded.
Compute the ~~qua~~ coordinates of all the corners point of the feasible reason.

Step 5: Find out the value of the objective function at each corner point determine in Step 4.

Step 6: Select the corner point that optimise (maximize or minimize) the value of the objective function. It gives the optimum feasible solution.

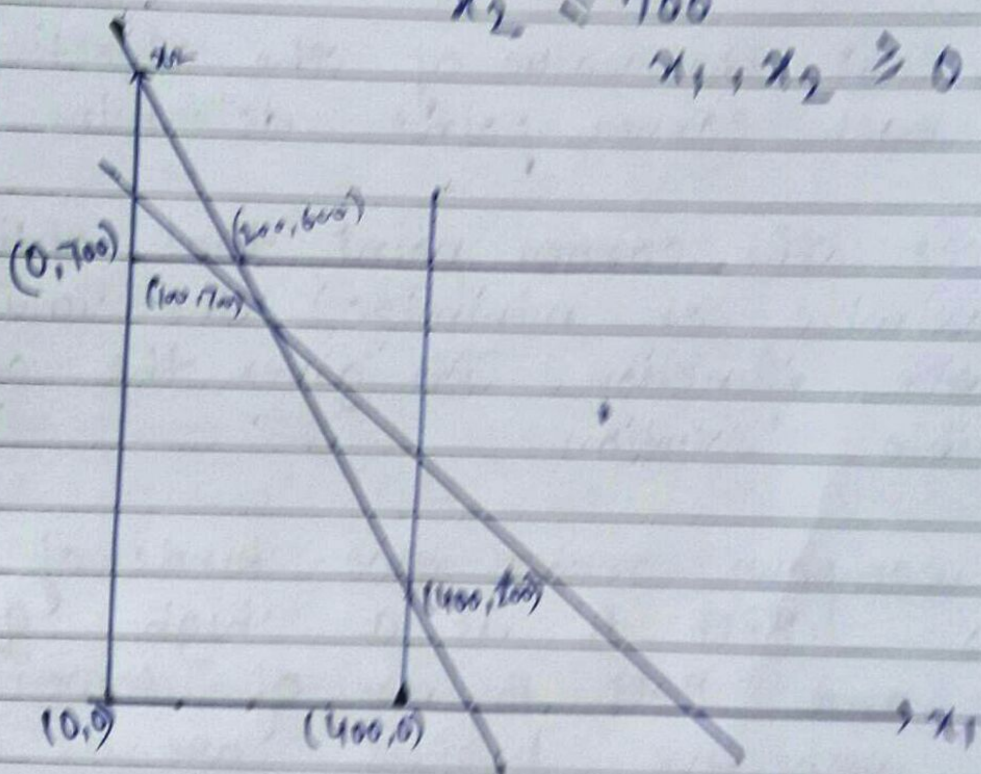
Ques A company makes two kinds of leather belts. Belt A is a high quality belt and Belt B is of lower quality. The respective profits are as Rs 4 and are as Rs 3 per value. Each belt of type A require twice a much time as a belt of type B and if all belts were of type B. The company could make 1000 per day. The supply of leather is sufficient for only 800 belts per day (Both A and B combine). Belt A require a fancy buckle and only 400 per day available.

There are only 700 buckles a day available for belt B. Determine the optimal product ?

$$\text{Max } z = 4x_1 + 3x_2$$

Subject to constant

$$2x_1 + x_2 \leq 1000$$
$$x_1 + x_2 \leq 800$$
$$x_1 \leq 400$$
$$x_2 \leq 700$$
$$x_1, x_2 \geq 0$$



O(0,0)	0
P (400,0)	1600
Q (400, 200)	2200
R (200,600)	2600
S (100, 700)	2500
T (0, 700)	2100

$$\text{Max } z = 4x_1 + 3x_2$$
$$= \underline{2600}$$