

Advanced Algorithms

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Lab 7 – Solution of assignments

Assignment 06

Solve the following LP graphically. For each model state clearly whether it is infeasible, it is unbounded, or it has multiple solutions

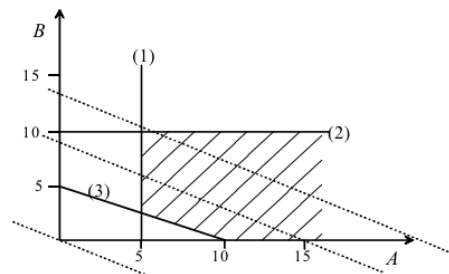


a)	$\begin{aligned} \text{Max } & 3A + 5B \\ & A \geq 5 \\ & B \leq 10 \\ & A + 2B \geq 10 \\ & B \geq 0 \end{aligned}$
b)	$\begin{aligned} \text{Max } & P + Q \\ & P + 2Q \leq 6 \\ & 2P + Q \leq 8 \\ & P \geq 7 \\ & Q \geq 0 \end{aligned}$
c)	$\begin{aligned} \text{Max } & M + 2N \\ & M + N \leq 25 \\ & 2M + N \leq 30 \\ & N \leq 35 \\ & M, N \geq 0 \end{aligned}$
d)	$\begin{aligned} \text{Max } & 5X + 2Y \\ & 7,5X + Y \leq 15 \\ & 5X + 2Y \leq 20 \\ & X, Y \geq 0 \end{aligned}$

Assignment 06

Solution

- a) The solution area is unbounded to the right and the value of the objective function can increase indefinitely without ever reaching a maximum. The solution is unbounded.

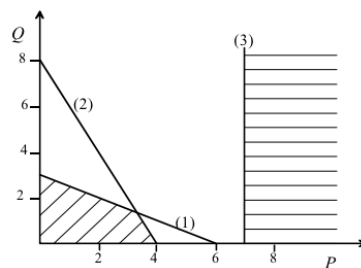


Assignment 06



Solution

- b) There is no area satisfying all the inequalities simultaneously. Therefore, the LP problem is infeasible and there is no solution to this LP model.

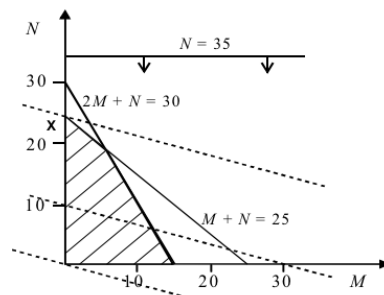


Assignment 06



Solution

- c) The optimal solution is at vertex X. Zero units of M and 25 units of N should be produced for a maximum profit of 50 units



Assignment 06



Solution

- d) The isoprofit lines are parallel to the second constraint. The optimal solution is therefore found on the line segment AB. Any point on the line segment AB gives the maximum profit of 20 units. This LP problem has multiple optimal solutions.

