INDIAN SCHOOL NIZWA - WORKSHEET

MATHEMATICS

CH-12. Linear Programming

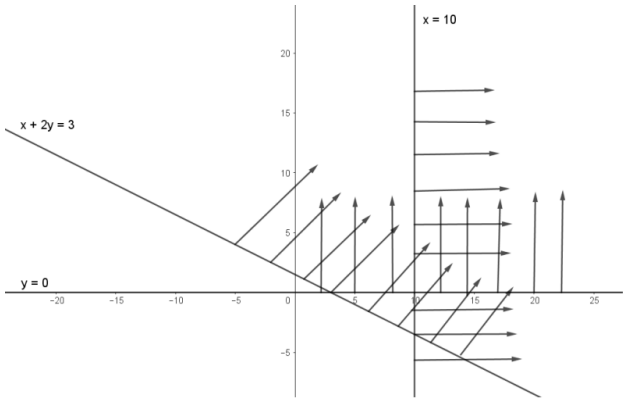
Practice Questions

Name_____ Date:26/01/2025 Class: XII Sec: A

1.	Solve the following linear programming problem graphically: Maximise $Z = 4x + y$ subject to the constraints: $x + y \leq 50$ $3x + y \leq 90$ $x \geq 0, y \geq 0$
2.	Solve the following linear programming problem graphically: Minimise $Z = 200x + 500y$ subject to the constraints: $x + 2y \geq 10$ $3x + 4y \leq 24$ $x \geq 0, y \geq 0$
3.	Solve the following problem graphically: Minimise and Maximise $Z = 3x + 9y$ subject to the constraints: $x + 3y \leq 60$ $x + y \geq 10$ $x \leq y$ $x \geq 0, y \geq 0$
4.	Determine graphically the minimum value of the objective function $Z = -50x + 20y$ subject to the constraints: $2x - y \geq -5$ $3x + y \geq 3$ $2x - 3y \leq 12$ $x \geq 0, y \geq 0$
5.	Minimise $Z = 3x + 2y$ subject to the constraints: $x + y \geq 8$ $3x + 5y \leq 15$ $x \geq 0, y \geq 0$

6. The constraints of a linear programming problem along with their graphs is shown below:

$x + 2y \geq 3,\ x \geq 10,\ y \geq 0$



Which of the following inequality may be removed so that the feasible region remains the same in above graph?

(A) $x + 2y \geq 3$

(B) $x \geq 10$

(C) $y \geq 0$

(D) $x \geq 0$

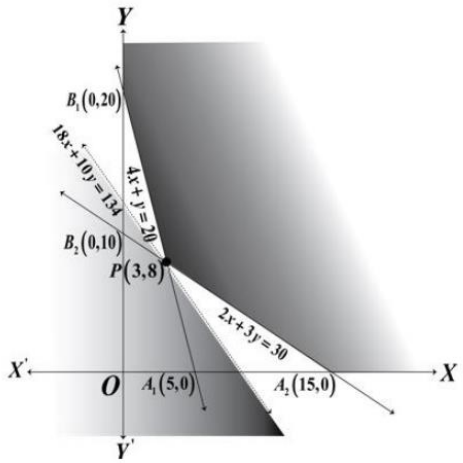
7. Consider the following Linear Programming Problem:

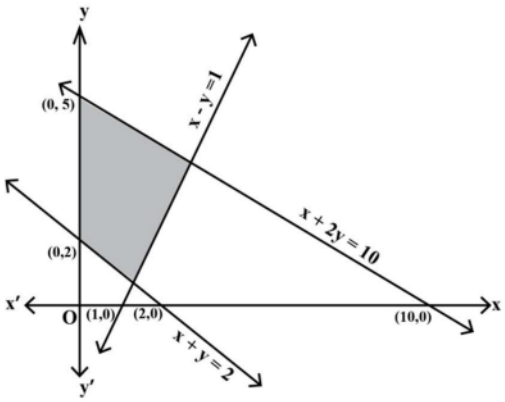
Minimise $Z = x + 2y$

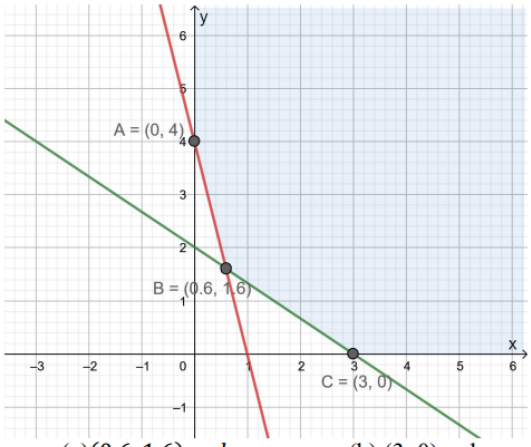
Subject to $2x + y \geq 3,\ x + 2y \geq 6,\ x, y \geq 0.$

Show graphically that the minimum of Z occurs at more than two points

8. The corresponding objective function is: $Z = 18x + 10y$, which has to be minimized. The smallest value of the objective function Z is 134 and is obtained at the corner point $(3,8)$,



	The optimal solution of the above linear programming problem _____. (A) does not exist as the feasible region is unbounded. (B) does not exist as the inequality $18x+10y<134$ does not have any point in common with the feasible region. (C) exists as the inequality $18x+10y>134$ has infinitely many points in common with the feasible region. (D) exists as the inequality $18x+10y<134$ does not have any point in common with the feasible region.
9.	The corner points of the bounded feasible region determined by a system of linear constraints are $(0,3),(1,1)$ and $(3,0)$. Let $Z = px + qy$, where $p, q>0$. The condition on p and q so that the minimum of Z occurs at $(3,0)$ and $(1,1)$ is (a) $p=2q$ (b) $p=\frac{q}{2}$ (c) $p=3q$ (d) $p=q$
10.	The feasible region corresponding to the linear constraints of a Linear Programming Problem is given below.  Which of the following is not a constraint to the given Linear Programming Problem? a) $x+y\geq 2$ (b) $x+2y\leq 10$ (c) $x-y\geq 1$ (d) $x-y\leq 1$
11.	Solve the following Linear Programming Problem graphically: Minimize: $z=x+2y$, subject to the constraints: $x+2y\geq 100,\ 2x-y\leq 0,\ 2x+y\leq 200,\ x,y\geq 0.$
12.	Solve the following Linear Programming Problem graphically: Maximize: $z=-x+2y$, subject to the constraints: $x\geq 3, x+y\geq 5,\ x+2y\geq 6, y\geq 0.$
13.	The corner points of the shaded unbounded feasible region of an LPP are (0, 4), (0.6, 1.6) and (3, 0) as shown in the figure. The minimum value of the objective function Z = 4x + 6y occurs at



(a)$(0.6, 1.6)$ *only* (b) (3, 0) only (c) (0.6, 1.6) and (3, 0) only
(d) at every point of the line-segment joining the points (0.6, 1.6) and (3, 0)

14. Solve the following Linear Programming Problem graphically:

Maximize Z = 400x + 300y subject to $x + y \leq 200, x \leq 40, x \geq 20, y \geq 0$