

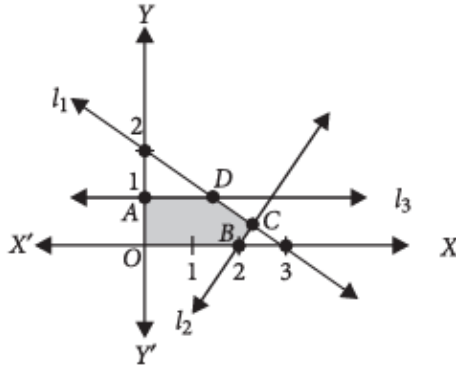
Previous Year CBSE Problems with Solutions

Problem 1:

2. Maximise $z = 8x + 9y$ subject to the constraints given below : $2x + 3y \leq 6$, $3x - 2y \leq 6$, $y \leq 1$; $x, y \geq 0$
(Foreign 2015) (6 Marks)

Solution:

2. Let $l_1 : 2x + 3y = 6$, $l_2 : 3x - 2y = 6$, $l_3 : y = 1$;
 $x = 0, y = 0$



Solving l_1 & l_3 , we get $D(1.5, 1)$

Solving l_1 & l_2 , we get $C\left(\frac{30}{13}, \frac{6}{13}\right)$

Shaded portion $OADCB$ is the feasible region, where coordinates of the corner points are $O(0, 0)$, $A(0, 1)$

$D(1.5, 1)$, $C\left(\frac{30}{13}, \frac{6}{13}\right)$, $B(2, 0)$.

The value of the objective function at these points are :

| Corner Points | Value of the objective function $z = 8x + 9y$ |
|---|---|
| $O(0, 0)$ | $8 \times 0 + 9 \times 0 = 0$ |
| $A(0, 1)$ | $8 \times 0 + 9 \times 1 = 9$ |
| $D(1.5, 1)$ | $8 \times 1.5 + 9 \times 1 = 21$ |
| $C\left(\frac{30}{13}, \frac{6}{13}\right)$ | $8 \times \frac{30}{13} + 9 \times \frac{6}{13} = 22.6$ (Maximum) |
| $B(2, 0)$ | $8 \times 2 + 9 \times 0 = 16$ |

The maximum value of z is 22.6, which is at

$C\left(\frac{30}{13}, \frac{6}{13}\right)$