Related Problems with Solutions

Problem 1:

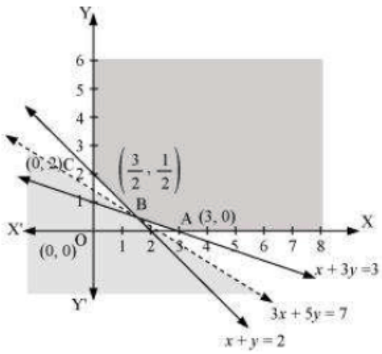
Question 4:

Minimise Z = 3*x* + 5*y*

such that $x+3y \geq 3,\ x+y \geq 2,\ x, y \geq 0$.

Answer

The feasible region determined by the system of constraints, $x+3y \geq 3, x+y \geq 2$, and *x*, *y* ≥ 0, is as follows.



It can be seen that the feasible region is unbounded.

The corner points of the feasible region are A (3, 0), $B\left(\frac{3}{2},\frac{1}{2}\right)$, and C (0, 2).

The values of Z at these corner points are as follows.

Corner point	Z = 3*x* + 5*y*	
A(3, 0)	9	
$B\left(\frac{3}{2},\frac{1}{2}\right)$	7	→ Smallest
C(0, 2)	10	

As the feasible region is unbounded, therefore, 7 may or may not be the minimum value of Z.

For this, we draw the graph of the inequality, 3*x* + 5*y* < 7, and check whether the resulting half plane has points in common with the feasible region or not.

It can be seen that the feasible region has no common point with 3*x* + 5*y* < 7 Therefore, the minimum value of Z is 7 at $\left(\frac{3}{2},\frac{1}{2}\right)$.