Question 03:

• Testing the optimality of the bases:

1) $B_1 = \{4, 5, 6\}$

$4 - 5 + 6 \not\leq 3$

B_1 isn't a solution

2) $B_2 = \{3, 5, 6\}$

$3 - 5 + 6 \not\leq 3$

B_2 isn't a solution

3) $B_3 = \{2, 3, 4\}$

$2 - 3 + 4 \leqslant 3$

$3 \times 2 + 2 \times 3 + 4 \not\leq 9$

B_3 isn't a Solution

TD 03

Question 01:

Suppose an LP has a feasible solution which of the following is not possible:

1) The LP has no corner point

possible: an LP can be unbounded.

2) The LP has a corner point that is optimal

possible: when the LP is bounded an has an optimal solution

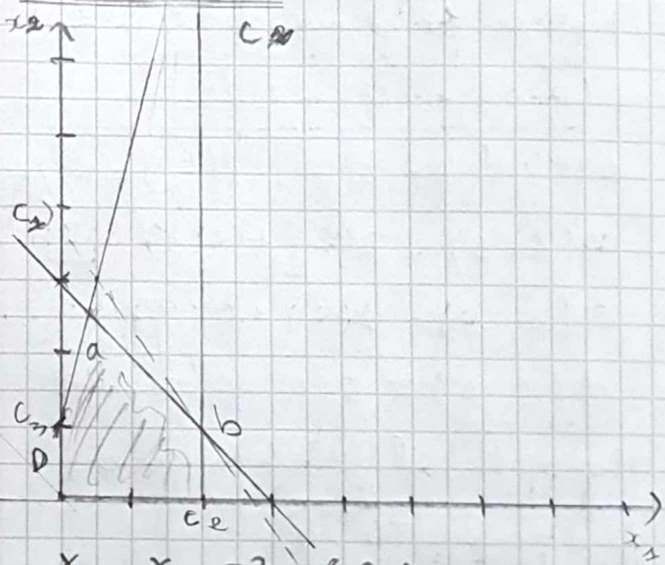
3) The LP has a corner point but there is no optimal solution

possible: if the feasible region exists but the LP is unbounded in the direction of optimization

4) The LP has a corner point and an optimal solution, but no corner point is optimal.

Not possible: if there is an optimal solution, it must lie on a corner point or along a line segment between two corner points in the feasible region.

Question 02:



$x_1 + x_2 = 3$ (C_1)

$x_1 = 2$ (C_2)

$-2x_1 + x_2 = 1$ (C_3)

Coordinate of feasible region

$$a : \begin{cases} x_1 + x_2 = 3 \\ -2x_1 + x_2 = 1 \end{cases}$$

$x_1 = \frac{2}{3}$, $x_2 = \frac{1}{3}$

$a\left(\frac{2}{3}, \frac{1}{3}\right)$

$$b: \begin{cases} x_1 + x_2 = 3 \\ x_1 = 2 \end{cases}$$

$b(2,1)$

$c(2,0)$

$d(0,1)$

$\frac{3}{3} - \frac{4}{3} = -\frac{1}{3}$

$$Z = 3x_1 + 2x_2 = 0$$

$$3x_1 = -2x_2$$

$$x_1 = -\frac{2}{3}x_2$$

x_1	$-\frac{2}{3}$	-2
x_2	1	3

Replace the corner points in Z:

$O(0,0) = 3(0) + 2(0) = 0$

$a(\frac{2}{3}, \frac{1}{3}) = 3(\frac{2}{3}) + 2(\frac{1}{3}) = 20/3$

$b(2,1) = 3(2) + 2(1) = \boxed{8}$

$c(2,0) = 3(2) + 6(0) = 6$

$d(0,1) = 3(0) + 2(1) = 2$

The optimal solution is b.