BDC 5101 Assignment 1 LI LIPING A0186040M

1. $\min\ 2x_1 + 3z_1$

s.t. $z_2 + z_3 \le 5$

$x_2 - 10 \le z_1$

$-x_2 + 10 \le z_1$

$x_1 + 2 \le z_2$

$-x_1 - 2 \le z_2$

$x_2 \le z_3$

$-x_2 \le z_3$

2. x_1 = number of units of special risk insurance

x_2 = number of units of Mortgage

(a) $\max\ 5x_1 + 2x_2$

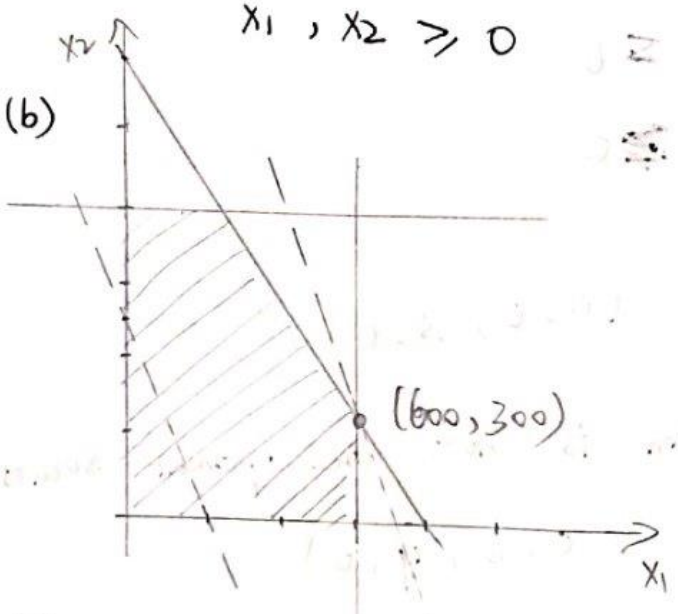
s.t. $3x_1 + 2x_2 \le 2400$

$x_2 \le 800$

$2x_1 \le 1200$

$x_1, x_2 \ge 0$

(b)



∴ The optimal solution is

$\begin{cases} x_1 = 600 \\ x_2 = 300 \end{cases}$ profit = 3600

(c)

$\begin{cases} 3x_1 + 2x_2 \le 2400 \\ 2x_1 \le 1200 \end{cases}$

3.(a) $(1,0,0)$

$(0,1,0)$

$(0,0,1)$

$(0,0,0)$

(b) $(1,0,0,0)$

$(0,1,0,0)$

$(0,0,2,0)$

$(0,0,0,0)$

4. the extreme points : $(1,0)$

the optimal solution :

no optimal solution or all the points are optimal solutions

5. $\min -x_1 - x_2 + 0 \cdot s_1 + 0 \cdot s_2$

s.t. $x_1 - x_2 + s_1 = 3$

$x_1 + x_2 + s_2 = 6$

$x_1, x_2, s_1, s_2 \geq 0$

basic feasible solution : $(0,0,3,6)$

this basic feasible solution is not the optimal solution

the optimal solution is $(0,6,9,0)$

6. (a)

$$\max \sum_{i=1}^{n} r_i (s_i - x_i)$$

$$\text{s.t.} \sum_{i=1}^{n} q_i x_i * (1 - 0.01)$$

$$-0.3 \times \sum_{i=1}^{n} (q_i - p_i) \cdot x_i \geq k$$

$$x_i \geq 0$$