640631125 Pimchanok Duang-In

Homework 5: Problem Solving

Mathematic: Optimization Model

Decision Variable

X_1 : The number of vanilla ice cream (boxes)

X_2: The number of strawberry ice cream (boxes)

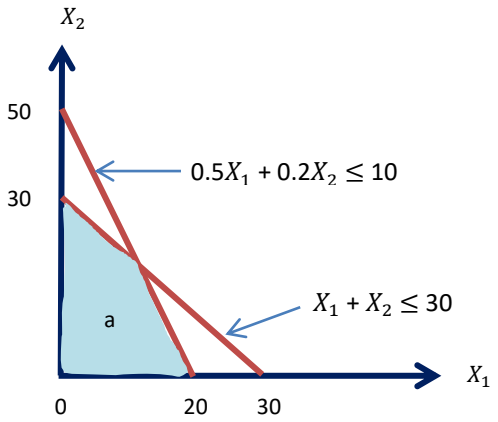
Objective

Max profit: $2X_1 + 3X_2$

Constraints

1. Fresh milk: $0.5X_1 + 0.2X_2 \leq 10$ (1)
2. Doll: $X_1 + X_2 \leq 30$ (2)
3. $X_1 , X_2 \geq 0$

Result



- Find the maximum profit from the possible values of X_1 and X_2

Way 1: X_1 = 0 and X_2 = 0

Profit = 2(0) + 3(0)

Profit = 0

Way 2: X_1 = 0 and X_2 = 30

Profit = 2(0) + 3(30)

Profit = 90

Way 3: X_1 = 20 and X_2 = 0

Profit = 2(20) + 3(0)

Profit = 40

Way 4: X_1 = 13 and X_2 =17

(1)*2:	X_1 + 0.4X_2	=	20	(3)
(2)-(3)	0.6X_2	=	10	
	X_2	=	16.67	
Plug X_2 in (2)	X_1 + 16.67	=	30	
X_1	=	13.33		

Profit = 2(13) + 3(17)

Profit = 77

As a result, **way 2** get the optimize profit of $90. So, we will produce only strawberry ice cream in 30 boxes to get a maximum profit.