Hakan Sandikci 150119809 IE 3035
Quiz 1

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Question: Wild West produces two types of cowboy hats. A type 1 hat requires three times as much labour time as a type 2. If the all available labor time is dedicated to Type 2 alone, the company can produce a total of 450 Type 2 hats a day. The market limits for the two types are 100 and 300 hats per day for Type 1 and Type 2 respectively. The profit is $8 per Type 1 hat and $5 per Type 2 hat. Determine the number of hats of each type that would maximize profit.

i: Build the mathematical model of the problem

ii: Solve the problem graphically.

Answers starts at the next page.-

i) Building the model:

Type 1	Type 2
x_1	x_2

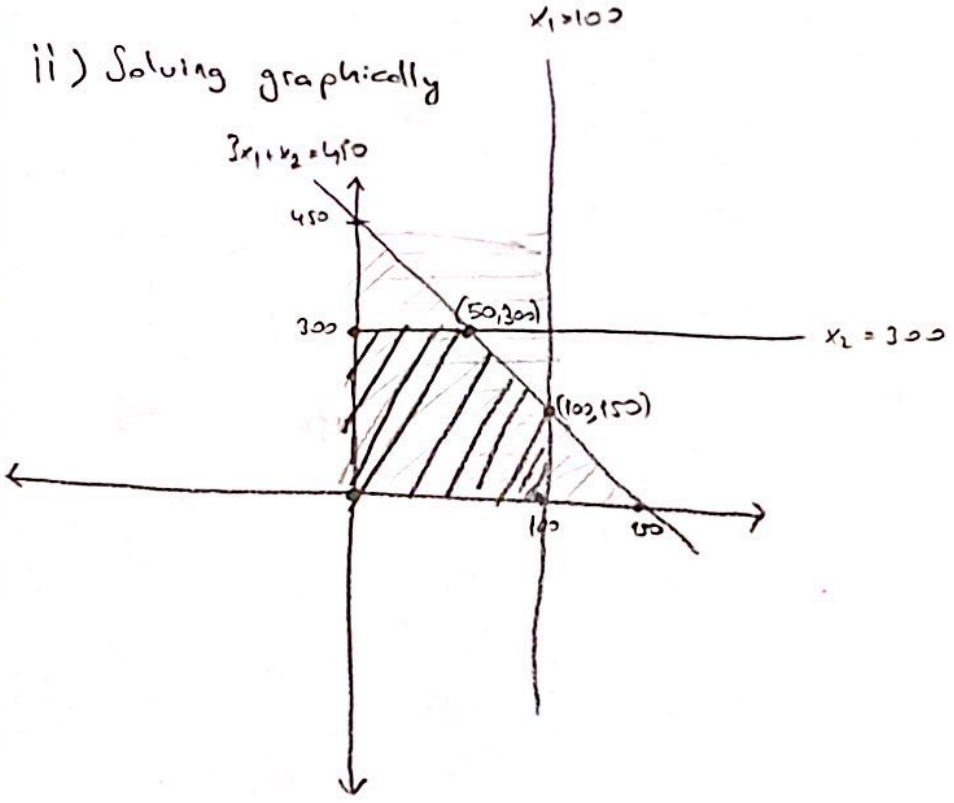
Objective function = $8x_1 + 5x_2$

Constraints = $3x_1 + x_2 \leq 450$ (labour)

$x_1 \leq 100$

$x_2 \leq 300$

ii) Solving graphically



$3x_1 + x_2 = 450$

$x_1 - 100 = 0$

$3x_1 + x_2 = 450$

$x_2 - 300 = 0$

$3x_1 + x_2 = 450$

$x_2 = 150$

So i have 2 points which are (50,300) and (100,150), i will use objective func. to get maximum profit

$8x_1 + 5x_2 = 8(50) + 5(300) = 1900\$$

$8x_1 + 5x_2 = 8(100) + 5(150) = 1550\$$

1900 is greater than 1500 so, the shop should sell 50 of Type 1 and 300 of Type 2 hats.

Answer =

Type 1	Type 2
50	300