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Question:

1. Wild West produces two types of cowboy hats. A type 1 hat requires three times as much labor 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

Solution:

i)

	Type 1	Type 2
labor	3	1
market limit	100	300
profit	$8	$5

x_1: amount of product Type 1 produced.

x_2: amount of product Type 2 produced.

maximize profit z: $8x_1 + 5x_2$

Constraints:

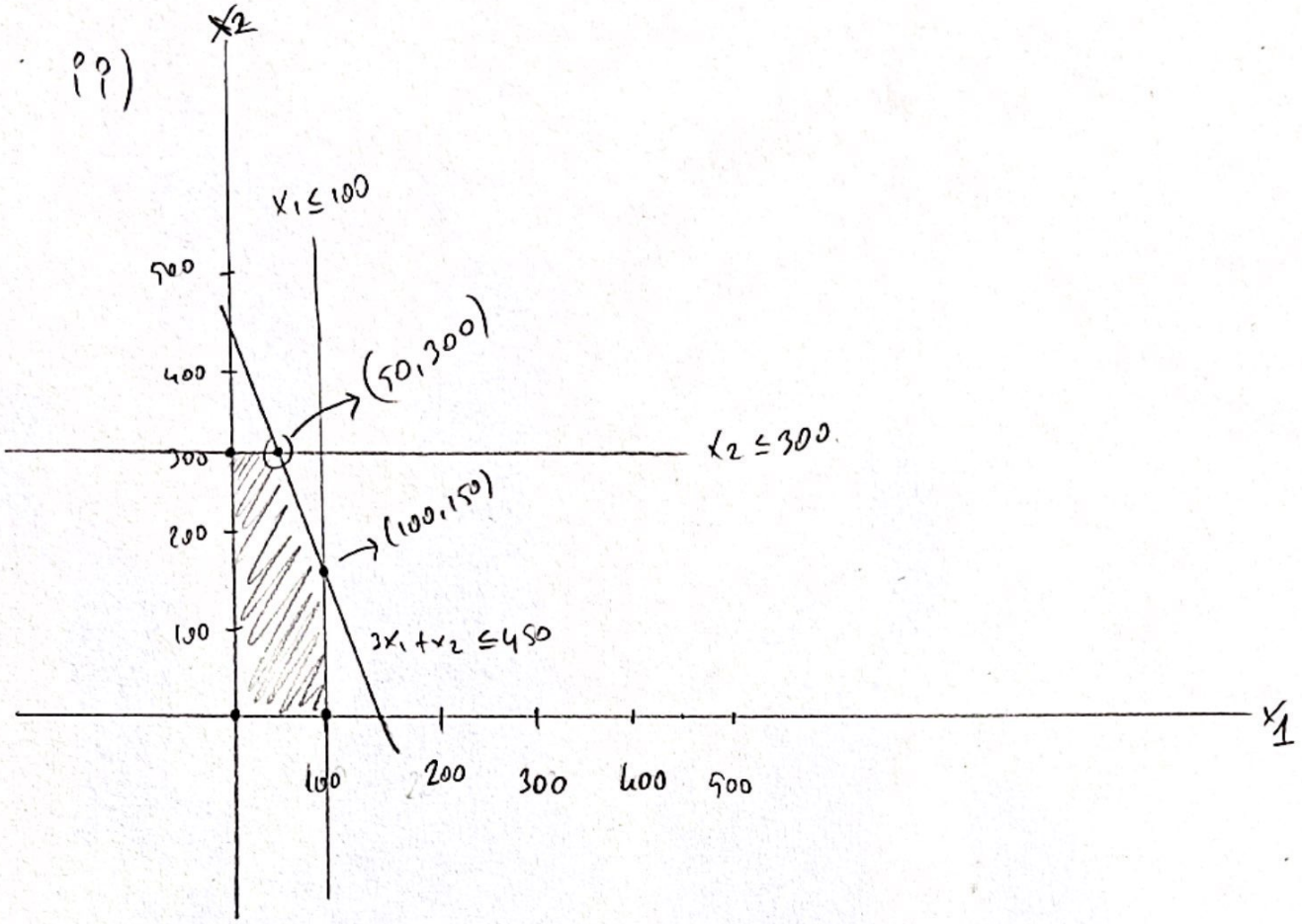
$$x_1 \leq 100$$

$$x_2 \leq 300$$

$$3x_1 + x_2 \leq 450$$

$$x_1, x_2 \geq 0$$

??)



$X_1 = 100$

$X_2 = 150$

$8X_1 + 5X_2 = 1550$ <

$800 + 750$

$X_1 = 50$

$X_2 = 300$

$8X_1 + 5X_2 =$

$400 + 1500 = 1900$

Optimal solution = 1900