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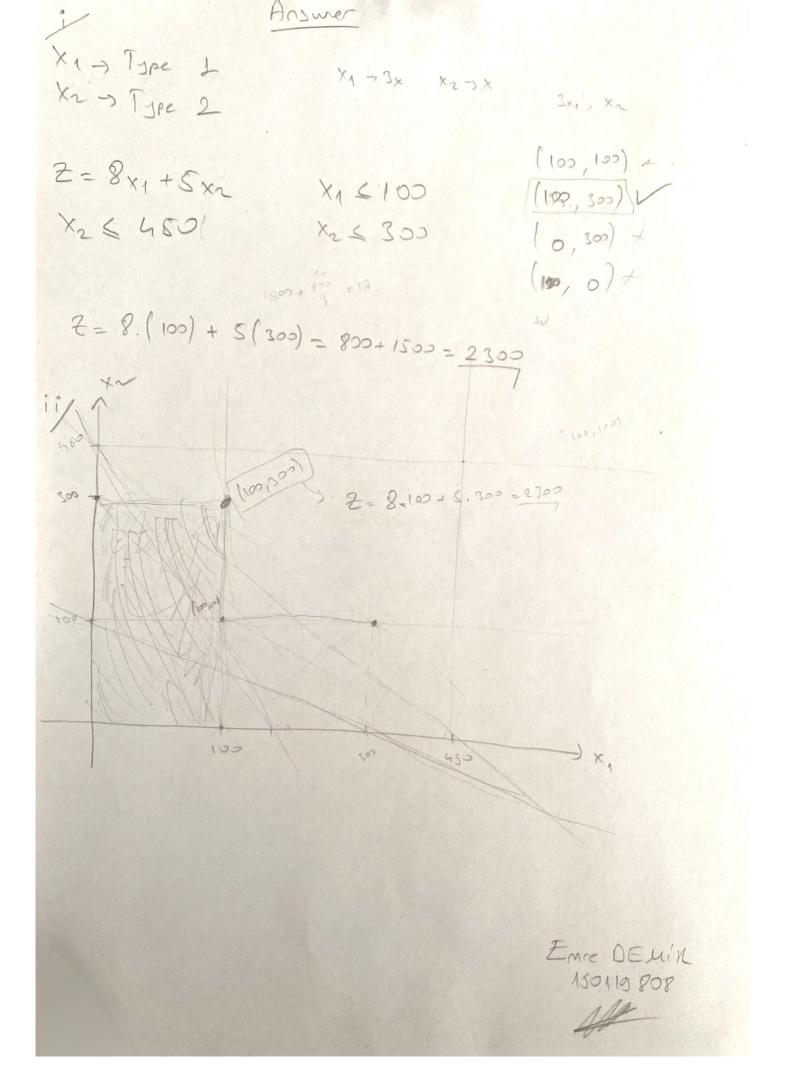
Emre DEMIR   150 119 808   ~~_____~~

Question 1

Will 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 avaible 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 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.

x_1 x_2

$Z = 8x_1 + 5x_2$

$3x_1 = x_2$

$x_1 \le 100$

$x_2 \le 300$

$x_2 \le 450$

i/

$X_1 \to$ Type 1
$X_2 \to$ Type 2

$X_1 \to 3x \qquad X_2 \to x$

$3x_1, x_2$

$Z = 8x_1 + 5x_2 \qquad X_1 \leq 100$

$X_2 \leq 450 \qquad X_2 \leq 300$

$(100, 100)$ ✗

$(100, 300)$ ✓

$(0, 300)$ ✗

$(100, 0)$ ✗

$1500 + \frac{800}{3} = 17$

$Z = 8 \cdot (100) + 5(300) = 800 + 1500 = \underline{2300}$

ii/

$(100, 300)$
$Z = 8 \cdot 100 + 5 \cdot 300 = \underline{2300}$

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