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1-) Wild West produces two types of cowboy hats. Type 1 requires three times as much labor time as a type 2. All labor time is type 2, 450 per day The market limits for the two types are 100 and 300 hats per day for Type 1 and Type 2. Profit is $8 Type 1 and $5 Type 2. Determine the number of hats of each type that would maximize profit

a) Build mathemical model for problem

$x_1 \rightarrow$ Type 1 count

$x_2 \rightarrow$ Type 2 count

Type 2 → T labor

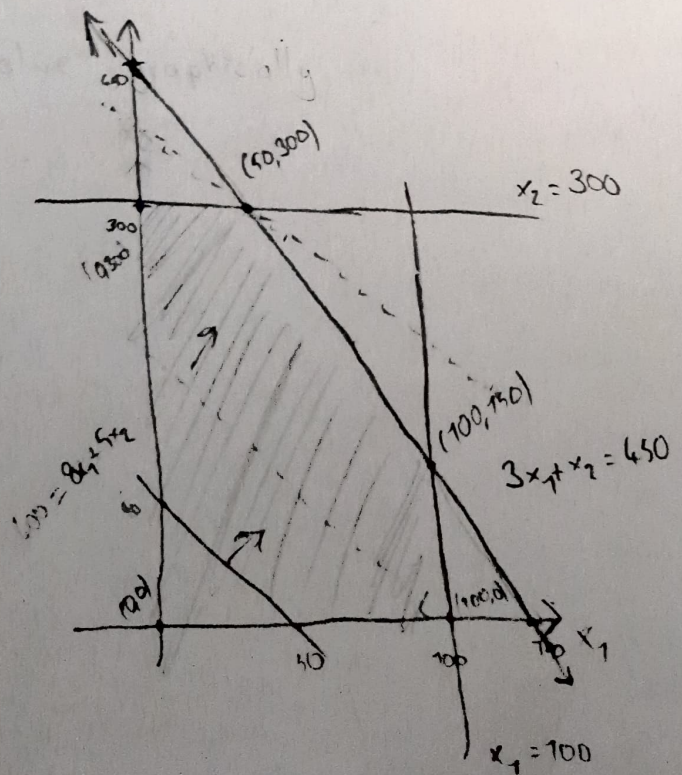
Type 1 → 3T labor

$x_1 . 3T + x_2 . T = 450T$

obj func → maximize; $Z = 8x_1 + 5x_2$

$$\left.\begin{aligned} 3x_1 + x_2 &\leq 450 \\ x_1 &\leq 100 \\ x_2 &\leq 300 \end{aligned}\right\} \text{constrains}$$

b) Solve graphically



x_1	x_2	profit $(8x_1 + 5x_2)$
0	0	0
0	300	1500
50	300	1900 (Max)
100	150	1550
100	0	800

Answer

$x_1 = 50$ Type 1

$x_2 = 300$ Type 2