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Bihter

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 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.

(i.)

Two hat → Type 1 → 3 Type 1 (labor time) = Type 2 (labor time)
→ Type 2 → sadece bu üretilirse 450 üretilebilir.

decision variables:

x_1 = # of Type 1 hats produces per day

x_2 = # of Type 2 hats produces per day

constraints:

① $x_1 \leq 100$
② $x_2 \leq 300$
③ $x_1, x_2 \geq 0$ (non negativity constraint) → $x_1, x_2 \in Z^+$ ↓ (ILP)
④ $x_2 = 450$ (alone)
⑤ $x_1 = 150$ (alone)
⑥ $3x_1 = x_2$

objective func.

$\max Z = 8x_1 + 5x_2$

(ii)