IE Quiz 1

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Enes

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.

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1) Modelization

labor constraint: $3x_1 + x_2 \leq 450$

objective function $P = 8x_1 + 5x_2$

market constraint:

$x_1 \leq 100$

$x_2 \leq 300$

maximize: $P = 8x + 5y$

non-negativity constraint $x_2 \geq 0$

$x_1 \geq 0$

Subject to:

$3x_1 + x_2 \leq 450$ $\quad x_1 \geq 0 \quad x_2 \geq 0$

$x_1 \leq 100$

$x_2 \leq 300$

$P = 8x_1 + 5x_2$

P

0, 0 → 0

0, 300 → 1500

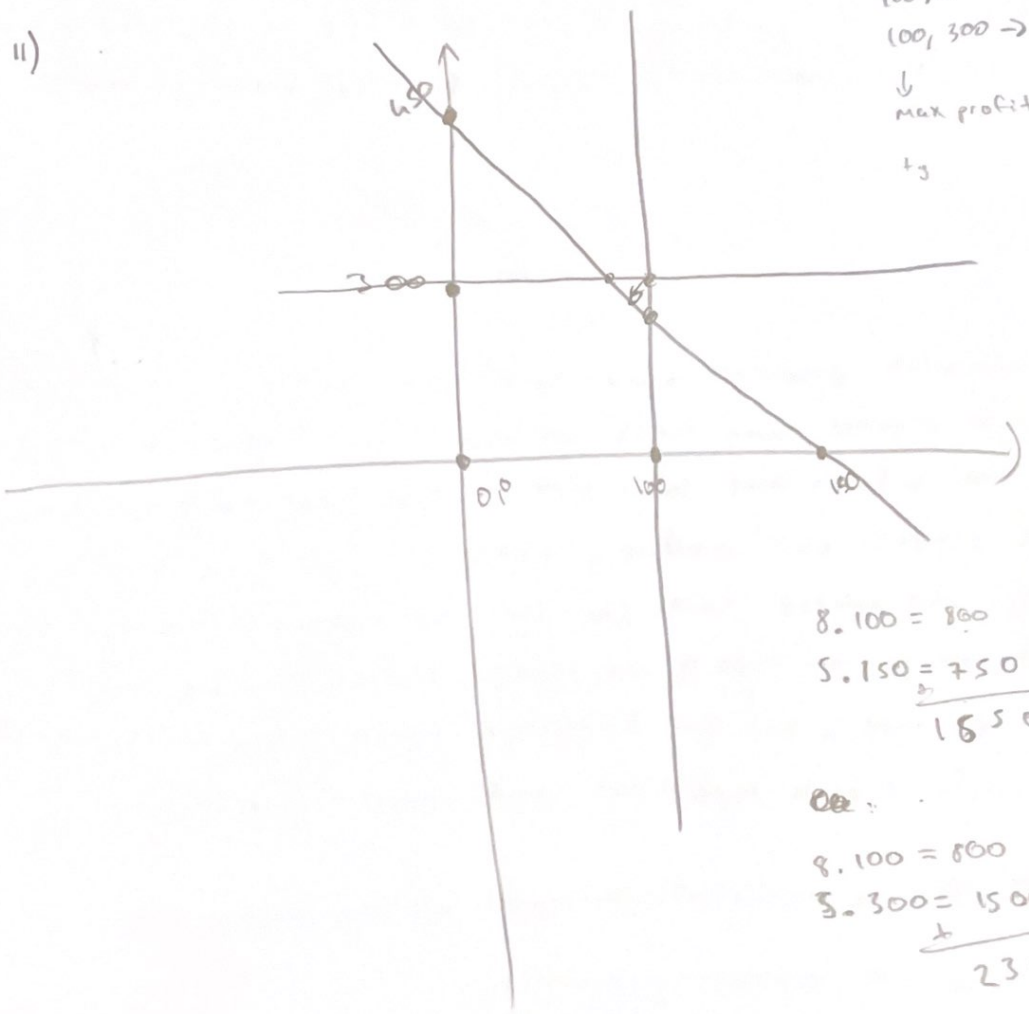
100, 150 → 1550

100, 300 → 2300

↓

max profit

ii)



$8 \cdot 100 = 800$

$5 \cdot 150 = 750$

1550

$8 \cdot 100 = 800$

$5 \cdot 300 = 1500$

2300

to maximize the profit type 1 should be created 100 times and type 2 should be created 300 times.