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IE 3035 Quiz 1 April 26 2023

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Q1 Wild West produces two types of cowboy hats. A type 1 hat requires three times as much labor time as type 2. If the all available labor time is dedicated to type2 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 Type2, 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. Bild the mathematical model of the problem.

ii. Solve the problem graphically.

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(i) x_1 x_2 → variables

x_1 ↓ number of type 1

x_2 ↓ number of type 2

objective → $8x_1 + 5x_2$ → maximize

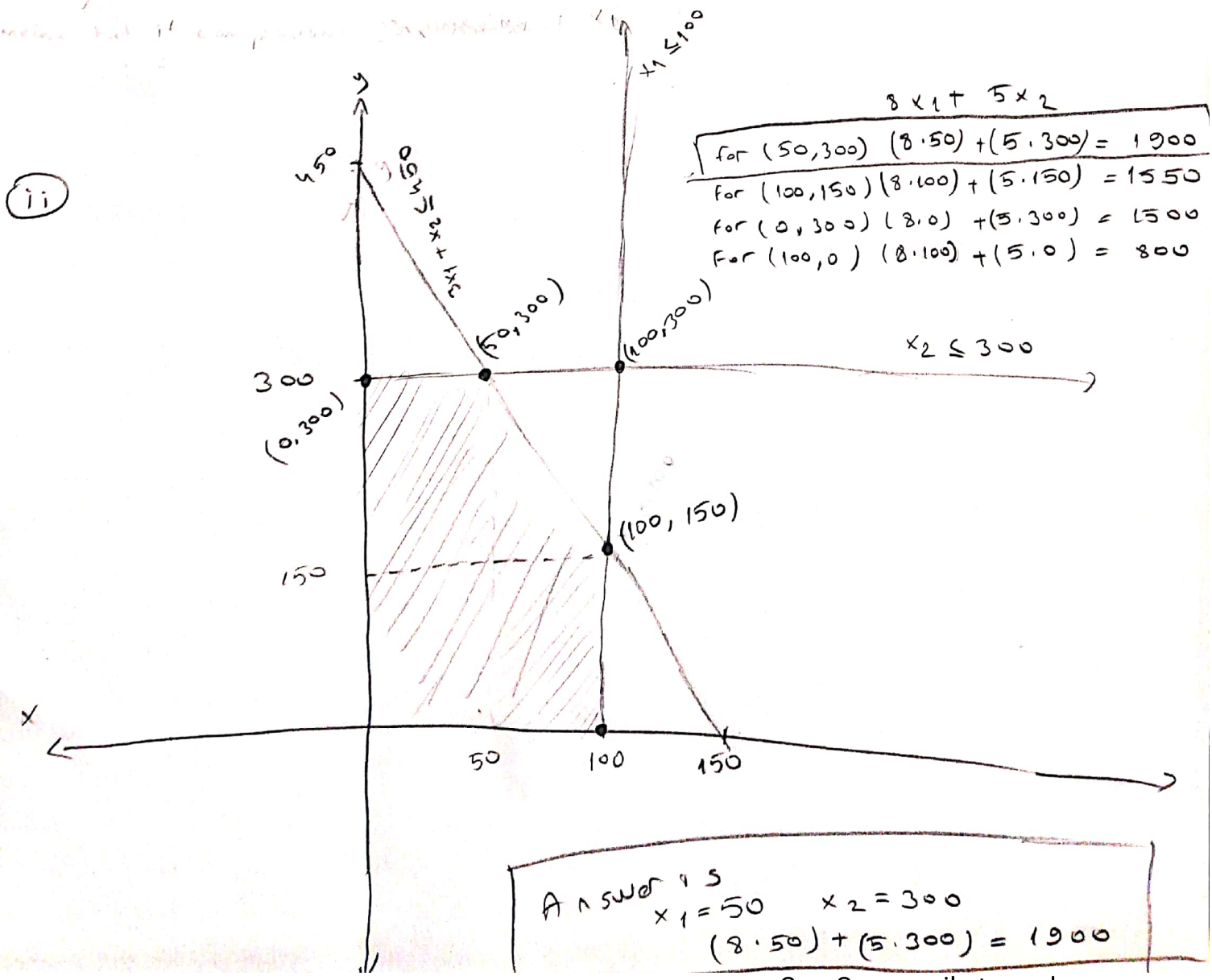
$3x_1 + x_2 \leq 450$

$x_1 \leq 100$

$x_2 \leq 300$

} constraints

(ii)



$8x_1 + 5x_2$

for (50,300) $(8 \cdot 50) + (5 \cdot 300) = 1900$

For (100,150) $(8 \cdot 100) + (5 \cdot 150) = 1550$

for (0,300) $(8 \cdot 0) + (5 \cdot 300) = 1500$

For (100,0) $(8 \cdot 100) + (5 \cdot 0) = 800$

Answer is

$x_1 = 50 \quad x_2 = 300$

$(8 \cdot 50) + (5 \cdot 300) = 1900$