I am aware that any forms of cheating in this exam will result in a zero grade and a disciplinary investigation. I accept all rules and regulations regarding online exams. I give permission for the processing of my personal data as stated in the Clarification Text provided on the Faculty of Engineering website.

Melis

Q-) 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 ovoiable labor time is dedicated to type 2 alone, the company can produce a total of 450 Type2 hats a day. The market limits for the two types are 100 and 300 hats per day for Type1 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-) Build the mathematical model of the problem

ii-) Solve the problem graphically.

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step1

Type 1 ⇒ 3T
Type 2 ⇒ T

Type 1 → 8$
Type 2 → 5$

X_1 = amount of type1
X_2 = amount of type2

$Z = 8X_1 + 5X_2$

step2

$X_1 \leq 100$
$X_2 \leq 300$

max = 450

$3X_1T + X_2T \leq 450$

step 3

$X_1 = 50$
$50 \times 3 = 150$
$X_2 = 300$

$3\times50 + 300 = 450$ (150)

$8\times50 + 5\times300 = 1900$ (400, 1500) best solution

$X_1 = 100$
$X_2 = 150$

$3\times100 + 150 \leq 450$ (300)

$8\times100 + 5\times150 = 1550$ (800, 750)

225 ① ② 1125

75 ③ ④ 600

$X_1 = 75$

$3.75 + 225 \leq 450$ (225)

$8.75 + 225\times5 \Rightarrow 1725$

ii-)

$Z = 8x_1 + 5x_2$

$x_1 \leq 100$

$x_2 \leq 300$

$3x_1T + x_2T \leq 450$

$3x_1 + x_2 = 450$

$x_2 = 450$

$x_2 = 0$

$3x_1 = 450$

$x_1 = 150$