I am aware that any form 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.

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1) Wild West produces two types of cowboy hats. A type 1 hat requires <u>three times</u> as much labor time as a type 2. If all the 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.
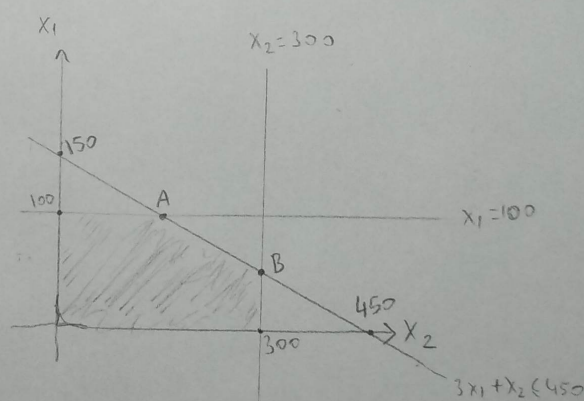
    I. Build the mathematical model of the problem.
    II. Solve the problem graphically.

max $z = 8x_1 + 5x_2$

s.t. $3x_1 + x_2 \leq 450$

       $x_1 \leq 100, \quad x_2 \leq 300$

       $x_1, x_2 \geq 0$

for   A $\Rightarrow$ $x_1 = 100$ and $x_2 = 150$ $\Rightarrow$ $z = 1550$
for   B $\Rightarrow$ $x_1 = 50$ and $x_2 = 300$ $\Rightarrow$ $z = 1900$

B > A $\Rightarrow$ $z = 8 \cdot 50 + 5 \cdot 300 = \boxed{1900}$
           Type 1   Type 2