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AB

(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 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.

i. **Decision variables:** X_1 = Produced hats type 1
X_2 = Produced hats type 2

Objective = maximize $Z = 8X_1 + 5X_2$

Subset: $X_1 \leq 100$
$X_2 \leq 300$
$3X_1 + X_2 \leq 450$

Optimal Solution:
(100, 150) $Z = 1550$
(50, 300) $Z = 1900$ ★

$Z = 8(50) + 300(5) = 1900$

So, for maximum profit, should produce 50 of type 1
300 of type 2

ii. Graphical Solution