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IE 3035
Quiz I

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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 labor time is dedicated to type 2 alone, the company can produce a total available 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 for type 1 and $5 for type 2. Determine the number of hats each type that would maximize profit.

   I) Build the math. model of the problem.
   II) Solve the problem graphically.

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I) Type 1 = 3x times
Type 2 = x times

Profit = 8A + 5B, to be maximized

The capacity is 450x

Let type 1 = A, $\quad$ A ≤ 100
type 2 = B. $\quad$ B ≤ 300

$3A\cancel{x} + B\cancel{x} \le 450\cancel{x}$

$3A + B \le 450$

(100, 150)
(50, 300)
(100, 0)
(0, 300)

$\Rightarrow$ 2 = 8A + 5B

8(100) + 5(150) = 1550
8(50) + 5(300) = 1900
8(100) + 5(0) = 800
8(0) + 5(300) = 1500

we have to choose the biggest profit for max.

In short, this company should produce 50 type 1 and 300 type 2 hats, and the profit will be 1900 $.

II) Let type 1 = x_1 and type 2 = x_2.

max $2 = 8x_1 + 5x_2$

$3x_1 + x_2 \le 450$

$\boxed{x_1 \le 100}$

$x_2 \le 300$

$x_1, x_2 \ge 0$