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a) Let x be the number of Type 1 hats produced and y be the Type 2

Type 1 hats: $3y = x$

$x \leq 100$ and $y \leq 100$

Total profit is $P = 8x + 5y$

We want to maximize the profit so the constraints are:

Total labor time available is

$3x\ y = 450$

$x \leq 100$

$y \leq 300$

$x \geq 0$

$y \geq 0$

$3x + y = 450$

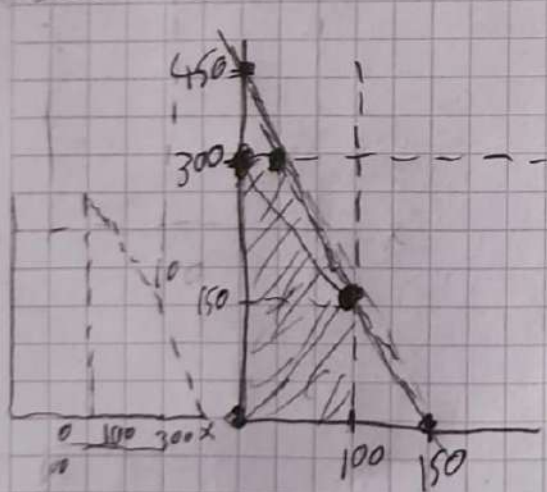
b) The graphical solution

$3x + y \leq 6$ represents a straight line with a slope of -3 and intercept on the y axis of 6

$x \leq 100$ vertical line at $x = 100$

$y \leq 300$ horizontal line at $y = 300$

$3x + y = 450$ represent a straight line passing through $(0, 450)$ and $(150, 0)$



To maximize profit we check corners

Corner points of the feasible section:

$(0, 300), (0, L), C(100, 150), (50, 300)$

$(0, 300)$ Profit $= 5(300) = 1500\$$

$(0, L)$: Profit $= 5(L)$

$(100, 150)$: Profit $= 8(100) + 5(150) = 1300\$$

$(50, 300)$: Profit $= 8(50) + 5(300) = 1700\$$

We conclude that $(50, 300)$ gives the highest profit of $1700\$$

Therefore the number of Type 1 hats should be produced per day is 50 and Type 2 hats per day is 300

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(1) Wilt west produces two types of cowboy hats A type 1 hat requires three times as much labour time as type 2 If all available labor times 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 each type that would maximize profit
(a) Build mathematical model of the problem
(b) Solve the problem graphically

Solutions are on the next page: