Manufacturing Problem

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I. Problem Statement

1) A manufacturing company makes two models A and B of a product. Each piece of Model A requires 9 labour hours for fabricating and 1 labour hour for finishing. Each piece of Model B requires 12 labour hours for fabricating and 3 labour hours for finishing. For fabricating and finishing, the maximum labour hours available are 180 and 30 respectively. The company makes a profit of Rs 8000 on each piece of model A and Rs 12000 on each piece of Model B. How many pieces of Model A and Model B should be manufactured per week to realise a maximum profit? What is the maximum profit per week?

II. Solution

Formulation of problem

Let,
x = number of pieces of model A
y = number of pieces of model B

According to the question, the problem can be formulated as:

$$maximize \qquad \begin{bmatrix}80000 & 12000\end{bmatrix}\begin{bmatrix}x\\y\end{bmatrix} \tag{1}$$

subject to

$$\begin{bmatrix}3 & 4\\1 & 3\end{bmatrix}\begin{bmatrix}x\\y\end{bmatrix} \leq \begin{bmatrix}60\\30\end{bmatrix} \tag{2}$$

Fig 1 shows the intersection of various lines and the optimal point indicated as P.
Code for generating above image is available here

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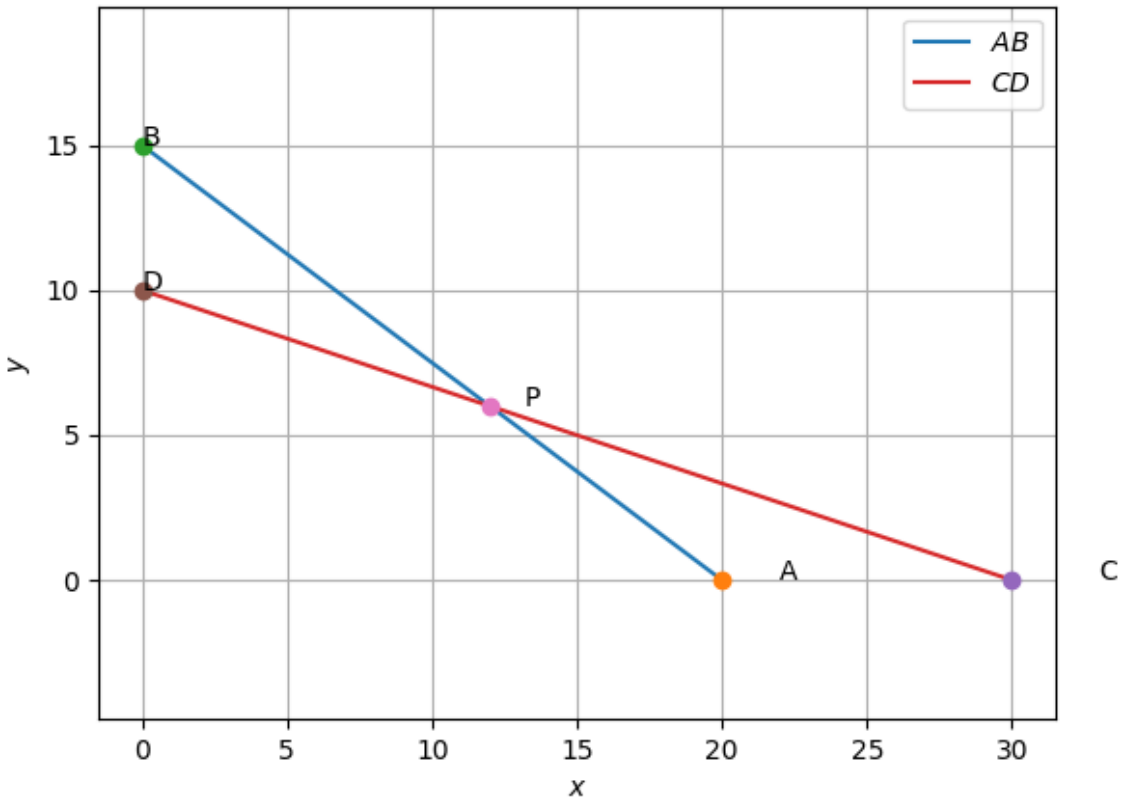

Fig. 1. Solution of Manufacturing Problem