Answer on Question #85669 – Math – Linear Algebra

Question

A company is producing two products, product A and product B. It takes 2 hours to produce one unit of product A and 1 hour to produce 1 unit of product B. To produce one unit of product B it costs 10 rupees. The total budget available is 100 rupees. It is required that the company produces at least 10 units of product A and product B taken together. However, the company cannot produce more than 5 units of product B. It is required to find how many units of A and B should be produced so that the total production time is minimized. Formulate the above problem as a linear programming problem and solve it by the graphical method.

Solution

Let x be the number of units of A should be produced, y be the number of units of B should be produced.

Then the constraints are:

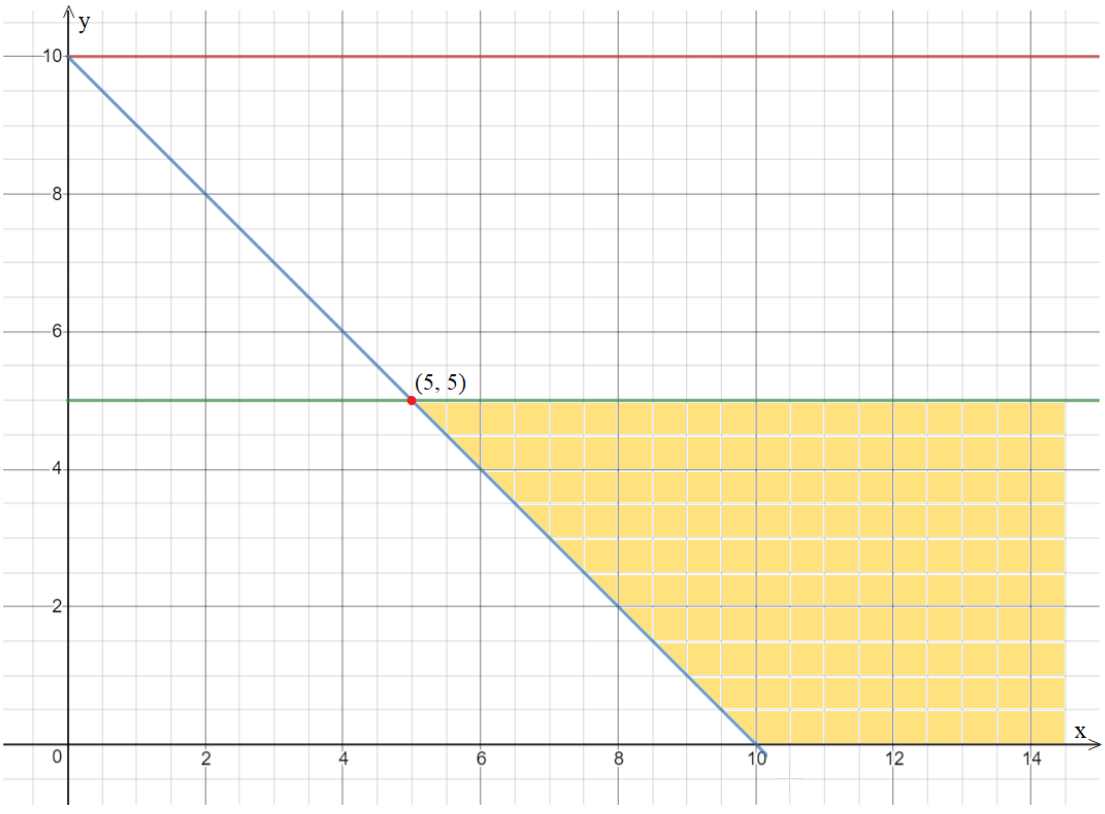
$10y \leq 100$

$x + y \geq 10$

$y \leq 5$

$x \geq 0, y \geq 0$

The objective is: minimize the total production time $2x + y$.



$$2x + y = x + y + x \geq 10 + x$$

$$\begin{matrix} y \leq 5 \\ y + x \geq 10 \end{matrix} \Rightarrow x \geq 5$$

A company has to produce 5 units of product A and 5 units of product B so that the total production time is minimized.