Answer on Question #44540 – Math - Algebra

Express the following problem situation as a linear system, and then solve it by substitution. Also show the linear system geometrically. A manufacturer produces two types of cupboards – deluxe and regular. Each deluxe cupboard requires 12 worker hours to cut and assemble, and 5 worker hours to finish. Each regular cupboard requires 8 worker hours to cut and assemble, and 3 hours to finish. On a daily basis, the manufacturer has available 440 worker hours for cutting and assembling, and 175 worker hours for finishing. How many cupboards of each type should be produced so that all the work power is utilized?

Solution:

Let **x** will be a the total number of deluxe cupboard and respectively **y** will be a the total number of regular cupboard which should be produced so that all the work power is utilized.

We have 440 worker hours for cutting and assembling, and 175 worker hours for finishing.

From here obtain a linear system

$$\begin{cases} 12 * x + 8 * y = 440 \\ 5 * x + 3 * y = 175 \end{cases}$$

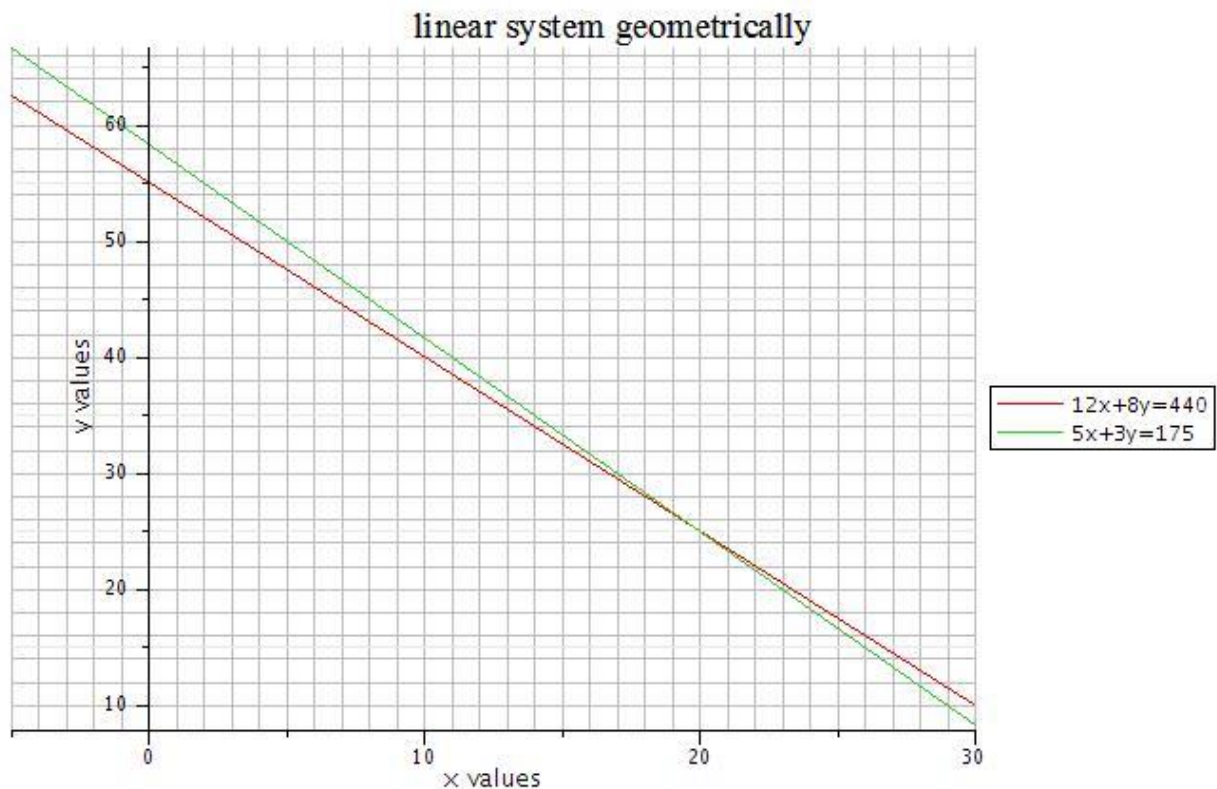From first equation(dividing by 8):

$$y = 55 - 1.5 * x.$$

Substituting y into second equation and collecting members obtained

$5 * x + 3 * (55 - 1.5 * x) = 175 \Rightarrow 0.5x=10$. Hence x=10/0.5=20 and y=55-1.5*20=25

Answer

Will be made **20** deluxe cupboard and **25** regular cupboard if all the work power should be utilized.

The linear system geometrically it's intersection of two lines on plane:

Solution of linear system is a point of intersection ((20, 25)) of lines 12x+8y=440 and 5x+3y=175.