Computer Desk - 4 hrs. cutting + 4 hrs. assembly $56

Bookcase - 3 hrs. cutting + 2 hrs. assembly $38

Cutting Dept. - 48 hrs./week

Assembly Dept. - 36 hrs./week

Modeling the Problem:

Let X be the number of computer desks that are sold and Y be number of bookcases sold.

1. Write down a linear inequality for the hours used in cutting.

$x + y \leq 48$ $4x + 3y \leq 48$

2. Write down a linear inequality for the hours used in assembly.

$x + y \leq 36$ $4x + 2y \leq 36$

3. There are two more constraints that must be met. These relate to the fact that the manufacturer cannot produce negative numbers of items. Write the two inequalities that model these constraints:

$x \geq 0$, $y \geq 0$

4. Next, write down the profit function for the sale of X desks and Y bookcases. This is the Objective Function for the problem.

$56x + 38y = P$

You now have four linear inequalities and a profit function. These together describe the manufacturing situation. These together make up what is known mathematically as a **linear programming** problem. Write all of the inequalities and the profit function together below. This is typically written as a list of constraints, with the profit function last.

$x \geq 0$

$y \geq 0$

$\begin{cases} 4x + 3y \leq 48 \\ 4x + 2y \leq 36 \end{cases}$

$56x + 38y = P$