Craft Studio Furnishings (CSF) produces a unique line of cane furniture. The items currently on the market are table chairs, easy chairs, and loveseats. The studio is considering introducing two new products — coffee tables and end tables — and is seeking to optimize its weekly production plan by means of a linear optimization model.

The production of any item consists of manufacturing a wooden frame, stretching the woven cane onto the frame, and finishing. A different shop at the studio performs each procedure. The table below shows the labor utilization by each product and the hours of labor available in each shop as well as the contribution to earnings of each product.

A table with numbers and text

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In addition to the resource constraints mentioned above, CSF wishes to limit the production of the new products (coffee tables and end tables) to no more than 10 units each per week.

You can see the linear optimization model formulation below:

|  |  |
| --- | --- |
|  | |
| **Objective function:** | |
| maximize | 30*TC* + 44*EC* + 57*LS* + 55*CT* + 45*ET* |
| **Subject to:** | |
| frame: | *TC* + *EC* + 1.3*LS* + 0.5*CT* + 0.5*ET* ≤ 40 |
| stretching: | *TC* + 1.2*EC* + 1.5*LS* + 2*CT* + 1.5*ET* ≤ 80 |
| finishing: | *TC* + 1.5*EC* + 1.7*LS* + *CT* + *ET* ≤ 60 |
| coffee table limit: | *CT* ≤ 10 |
| end table limit: | *ET* ≤ 10 |
| nonnegativity: | *TC, EC, LS, CT, ET* ≥ 0 |

The table below presents the spreadsheet solution sensitivity report:

A table with numbers and letters

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