Systems of Inequalities: Sandy Dandy Dune Buggies

Jacklyn Toyom, CEO of the Sandy Dandy Dune Buggy Company, has discovered that your team can help her understand the constraints on her business. She would like to hire your team to help her company. Here is her letter:

Dear Team,

I was so impressed to hear about how you helped the United Nations! I think your team could really help my company.

Here at the Sandy Dandy Dune Buggy Company we make two popular models of off-road vehicles: the Crawler and the Rover. Each week, we receive enough parts to build at most 15 Crawlers and 12 Rovers. The only exception to the supply of parts are the colored night lamps and high-definition speakers, which have to be specially manufactured for our off-road vehicles. Each of the Crawlers requires 5 of the lamps and 2 of the speakers. The Rover requires 3 lamps and 6 speakers. Our supplier is a small company and can only manufacture 81 of the lamps and 78 of the speakers for us each week.

Since we are also a small company, we have only 12 employees. By contract, the maximum number of hours each employee can work is 37.5 hours per week. It takes our employees 20 hours to assemble one Crawler and 30 hours to assemble one Rover.

Each Crawler sold brings in a profit of $500. The Rover is less expensive to manufacture than the Crawler but is very popular and can be sold at a profit of $1000 each.

I need a detailed proposal of how to maximize our profit that I can submit to our Board of Trustees. I look forward to a profitable business relationship!

Sincerely,

Ms. Jacklyn Toyom
CEO, Sandy Dandy Dune Buggy Company

Problem continues on next page →
Problem continued from previous page.

**Your task:** Write inequalities that would help Jaclyn Toyom determine the best combination of Crawlers and Rovers to produce each week to maximize the company’s profit. Create a detailed proposal to submit to Ms. Toyom that includes:

- All of the inequalities that you have written based on the information in her letter to your team.
- A possible number of Crawlers and Rovers to manufacture each week.
- Calculations and a full-page graph to justify your recommendation.

Constraints to keep in mind are the number of:

(1) speakers available  
(2) lamps available  
(3) total employee hours each week

**Discussion Points**

What is the maximum number of hours for all of the employees that can be worked in one week?

How can we justify that we have found the most profitable combination of each vehicle to manufacture?