**2.0.1 An Introductory Problem**

Q1. What do you think the production rates should be in order to generate the most profit?

Tables: Chairs:

Q2. Does the number of table and chairs produced each day have to be an integer value? Why?

Q3. Using only eight small and six large Legos, build a physical model of this problem. If Legos are unavailable, draw pictures to explore some possibilities. Create several combinations of tables and chairs this company could make using your model. Draw them below.

**Solving the Problem**

Q4. In a Table 2.0.1, record other combinations of tables and chairs the company could produce. For each combination, write the production rate of tables, the production rate of chairs, and the profit for each possibility.

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| --- | --- | --- |
| **Production Rate of Tables** | **Production Rate of Chairs** | **Total Profit** |
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Q5.Which production rates generate the most profit?

Q6. Did any product mix yield a profit greater than $52? Which one?

Q7. Why is building four tables an example of an infeasible solution?

Q8. Give another example of an infeasible solution?

**Stepping Beyond the Solution**

Q9. Would it make a difference if *seven* large pieces were available instead of six (there are still eight small pieces)? If so, what is the new optimal solution, and how much profit does it generate?

Q10. Would it make a difference if *nine* small pieces were available instead of eight (there are still six large pieces)? If so, what is the new optimal solution, and how much profit does it generate?

Q11. Would it make a difference if *seven* large pieces and *nine* small pieces were available? If so, what is the new optimal solution, and how much profit does it generate?

**Growing the Problem**

Q12. Use Table 2.0.2 to complete the following:

a) Make a suggestion for the number of tables and chairs to produce in this expanded problem.

b) Calculate the combined total number of small Lego pieces and large Lego pieces that are used in this suggestion. Be sure that both of the totals do not exceed the available number of Lego pieces.

c) Calculate the total profit for the suggested production rate of time.

d) Repeat the steps four more times, for a total of five suggestions. With each new suggestion, try to produce more profit than the suggestion before.

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| --- | --- | --- | --- | --- | --- |
|  | Production Rate of Tables | Production Rate of Chairs | Number of **Small** Lego Pieces used | Number of **Large** Lego Pieces Used | Total Profit |
| Suggestion 1 |  |  |  |  |  |
| Suggestion 2 |  |  |  |  |  |
| Suggestion 3 |  |  |  |  |  |
| Suggestion 4 |  |  |  |  |  |
| Suggestion 5 |  |  |  |  |  |

Q13. What difficulties did you experience when developing the feasible production plans in Q12?