

Moonbeam Appliance Corporation
1155 Crater Blvd.
Noer, Iowa 56478

Independent Mathematical Contractors
00 Anystreet
Anytown, Anystate 00000

Dear IMC:

My company manufactures several appliances in our facility in Noer, Iowa. In an attempt to gain a larger share of the small appliance market, we are planning to manufacture and sell a new two-slice electric toaster. This toaster will feature an eco-friendly design which will impact global temperature rise than our main competitor's model. By using local resources and a patented "No-Heat" design, we believe that our model will attract a portion of the market that has forsaken toast because of the impact on global warming.

After conducting extensive market surveys, our research department provided the data to the right regarding the demand of toasters at several different production levels. The finance department has estimated the cost at the same production levels.

We are planning to produce 2000 toasters per week, but want to examine the marginal profit at that level to help us plan for changing production needs in the future. We need you to find the profit function for the toasters and the marginal profit to help us decide whether it would be reasonable to change production from 2000 toasters per week. If we should change production, what level would be best?

To help you get started, your instructor has provided a technology assignment. In this technology assignment, you will find regression models for the data in the table. This will help you to find a revenue function $R(x)$ (from the demand function) and a cost function $C(x)$ where x is the number of toasters.

| Units (toasters) | Price per Unit (dollars) | Cost (dollars) |
|------------------|--------------------------|----------------|
| 1175 | 11.91 | 10789 |
| 1000 | 14.04 | 10143 |
| 1040 | 13.66 | 10208 |
| 1200 | 11.57 | 11198 |
| 1150 | 11.91 | 10593 |
| 1025 | 13.38 | 9979 |
| 1030 | 13.27 | 9978 |
| 1100 | 12.25 | 10696 |
| 1100 | 12.68 | 10383 |
| 1125 | 12.35 | 10624 |
| 1150 | 12.22 | 10602 |
| 1175 | 11.33 | 10935 |
| 1200 | 11.25 | 11103 |
| 1225 | 11.24 | 11166 |
| 1250 | 10.66 | 11031 |
| 1250 | 10.71 | 11110 |
| 1225 | 10.90 | 11040 |

The profit function $P(x)$ may be found from revenue and cost functions. To help decide the optimal production level, carefully examine the marginal profit when 2000 toasters are produced and sold. Use that value to guide you towards your proposed production level.

I look forward to your project documentation. A scientific expert (your instructor) is available to answer any questions that you might have in the course of your investigations. This expert will not be available to assist on this project over the weekend before it is due. You should plan on consulting with this expert as soon as possible if you are unclear on any of the requirements of

this project. You should also communicate with the rest of your team to make sure each member has read this letter and knows what is expected on this project.

Nell Armstrong
Vice President for Product Development