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 following estimates: a weekly demand of 1000 toasters can be expected at a price of $18.XX per toaster (where XX is the day of the month you were born) and a weekly demand of 1200 toasters can be expected at a price of $17.YY per toaster (where YY is the number corresponding to month you were born). If you born on 12/02, XX would be 02 and YY would be 12.

The finance department estimates that weekly fixed costs will be $5000 and variable costs (cost per unit) will be $5.

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 helps us decide whether it would be reasonable to change production from 2000 toasters per week.

To help you get started, let me suggest the following strategy:

1. Assume that the price-demand equation is linear. Use the research department's estimates to find a relationship between the price p and the number of toasters demanded x.
2. Find the revenue function R(x) in terms of the number of toasters demanded x.
3. Assume that the cost function C(x) is linear. Use the finance department's estimates to find the cost function.
4. Graph the cost function C(x) and the revenue function R(x) on the same graph. Find the number of units where we will break even.
5. Find the profit function P(x).
6. Find the marginal profit at a production level of 2000 toasters.

I look forward to your final technical memo. I expect that the report will be in technical memo format. 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.

Nell Armstrong
Vice President for Product Development