Montgomery Burns
Springfield
March 25, 2011

Math 236 Students
Wheaton College
Norton, MA 02766

Dear Multivariable Calculus Students:

Because of your recent excellent recommendations, The Montgomery Burns Traveling Revue and Revenue Generator™ was successful beyond our wildest dreams. In particular, the kids went crazy for the Angry Birds-themed snack cakes, and in order to take advantage of the popularity, we are planning open a series of Angry Birds-themed Snack Cake Pastry Shops this summer at selected locations throughout the country. However, when we needed help determining the optimal location of the central bakery and distribution center, your enterprising and resourceful professor naturally referred me to you.

After careful and meticulous marketing research, Smithers has recommended that we open our first Angry Birds-themed Snack Cake Pastry Shops in Sumrall, Mississippi, Atlanta, Georgia, and Green Bay, Wisconsin. In order to keep manufacturing and facilities costs down, we plan to use a considerable amount of preservatives and to make regular deliveries to each Pastry Shop from one central bakery. We expect to fly four shipments per month to Sumrall, six shipments per month to Altanta, and nine shipments per month to Green Bay. With the volatility of fuel prices these days, we obviously want to minimize the shipping costs. This is where I need your help in determining where to build the central bakery for the Angry Birds-themed snack cakes so that the total flight distance is as small as possible.

If the market is as strong as we anticipate, we will open an Angry Birds-themed Snack Cake Pastry Shop in East Rutherford, New Jersey for the summer of 2012, and another in Minneapolis, Minnesota for the summer of 2013. We expect that each of these locations will require three shipments per month. I would also like your expert recommndation for the ideal location of the central bakery for 2012 when the first four Pastry Shops are open, as well as for the ideal location when all five Pastry Shops are up and running in 2013.

In order to complete construction and be ready for our opening this summer, I would greatly appreciate your report by April 6 at 10:30a.m.

Capitalistically yours,
Montgomery Burns
CEO, The Montgomery Burns Traveling Revue and Revenue Generator™

A Few Comments From Your Enterprising and Resourceful Professor

Here are a few suggestions that may help you get started:

- The first thing you will need to do is find appropriate coordinates for the cities in the xy-plane. You will need to find the distances between the cities, and then you can find appropriate coordinates for the cities. Maple might well come in handy in solving any system of equations you get here.
- There are several web sites that may help you determine the distances between the cities and locations of airports. Here are a couple that may be useful:
  - infoplease Distance Calculator: http://www.infoplease.com/atlas/calculate-distance.html
    This will give you the great circle distance between locations, but it should be a good enough approximation for your purposes.
  - Airnav.com Airport Information: http://www.airnav.com/airports/search.html