Math 141 Honors Project #2
Due Tuesday, 11/6/07
Information Sheet

In this project, you will act as mathematical consultants to a (very) fictitious company. Your goal is to solve the simulated problem described in the attached letter. Your work will be evaluated on the correctness of the mathematics, the clarity of the writing, and the overall presentation.

You should hand in a typed report in the form of a standard business letter responding to the company. I expect that most reports will be approximately 3–5 pages, but it is acceptable to use more or less space if necessary. **All reports are due at the beginning of class on Tuesday, November 6.**

You will work together in groups of three or four students, assigned by Prof. Martin. You are responsible for contacting the other members of your group and deciding how to collaborate. All members of the group will receive the same grade on the project (out of 35 points).

You and your group are encouraged to make an appointment with the staff at the KU Writing Center (785-864-2399; http://www.writing.ku.edu/) to discuss your work. It may be most helpful for you to complete a rough draft before meeting with the Writing Center consultant.

You and your group are strongly encouraged to meet with Prof. Martin well in advance of the due date to discuss your progress. I will be happy to look at rough drafts and to provide advice on matters of both mathematical content and technical writing style.

The following checklist will be used to grade your assignment. Please use it as a guide while preparing your report.

Content (15 points)

Does the report:
1. Construct an accurate mathematical model of the problem to be solved?
2. Apply correct and appropriate mathematical techniques to solve the problem modeled?
3. Explain all symbols, terminology and notation used?
4. Explain how each equation is derived?

Clarity (15 points)

Does the report:
5. Solve the problem that was originally asked?
6. Appropriately cite all mathematical facts used?
7. Give a clear and well-organized explanation of how the model was constructed?
8. Give a clear and well-organized explanation of how the answer was found?
9. Give acknowledgement where it is due?

Presentation (5 points)

Does the report:
10. Use correct spelling, grammar and punctuation?
11. Label any figures, drawings or tables appropriately?
12. Look neat?

Isosceles Enterprises
345 Pythagoras Place
Truth or Consequences, NM 87901

October 10, 2007

Dear Consultants:

Having heard from our good friends at Braddock Plastics about your splendid success at getting them out of the soup, we would like to engage your mathematical consulting services.

We have recently purchased an amusement park and are in the process of renovating it. We'd like to put in a bumper car rink, but we have discovered to our chagrin that the patent on conventional bumper cars is owned by a large multinational corporation, who won't let us use their design without charging us a whopping fee. However, one of our most brilliant summer interns, a graduate of the University of Missouri, has come up with the revolutionary idea of designing a bumper car with triangular wheels. Our attorney, after he stopped laughing, has assured us that this innovation is a sure-fire way to avoid a lawsuit for patent infringement. Better yet, a focus group consisting of prospective clients between the ages of 6 and 12 strongly approved of the bumpiness of the ride. So we are very excited about this project. The local wheel factory has never manufactured triangular wheels before, but they do have in stock a healthy supply of square wheels measuring 2 feet on each side, which they are willing to cut in half for us to make triangles. (Those square wheels, by the way, were manufactured specially for the previous owner of the amusement park, who unsurprisingly went out of business — after all, who'd want to ride in a bumper car with square wheels?)

What you can help us with is how to design the wheels. The main question is where we should poke a hole in each wheel to put the axle. We'd like to make the ride as smooth as possible; we figure that it is going to be plenty bumpy no matter what we do, and we want to reduce the wear and tear on the rest of the bumper car. Unfortunately, we have no idea how to measure smoothness. So we need you to figure out both what makes a ride smooth or bumpy, and how to locate the axle so as to minimize bumpiness. Our brilliant summer intern will be in charge of implementing your solution. Please bear in mind when writing your report that he is very far from being an expert at calculus (he thinks the Limit Laws were enacted to prevent speeding on Interstate 70) but he is reasonably proficient at algebra and trigonometry.

We look forward to receiving your finished report of approximately 3–5 pages no later than Tuesday, November 6 at 11:00 AM. Our newly hired mathematical consultant (your fine instructor, whom we have managed to lure away from Braddock Plastics by doubling his retainer) has agreed to answer any questions that may arise in the course of your investigation and to assist you and your group in preparing your report. We regret, however, that said consultant will be unavailable during November 3–5, so we encourage you to take advantage of his services well in advance of the deadline.

Sincerely,

Blanche Wheelwright
Vice-President