Dear SMC:

Thank you for doing a bang up job on the analysis of the average number of moves it takes to move from one square to another on a game board. The R & D department head was so impressed, that he mentioned your findings to the company president over lunch one day. And you know what that means: a new strategic initiative.

Our president, Dr. Pei R. Fang, has charged the R & D department with bringing all of its scientists up to speed on the fundamental topics and methods of several variable calculus. Ideally, we would have an in-house library of short focused articles on specific topics. Each article should begin with a cover letter. The article proper should include at least four sections:

1. Introduction and Overview
2. Examples
3. Applications
4. Bibliography

The bibliography should consist not only of a URL or library catalogue listing but also a brief 2-3 sentence synopsis for each entry. There should be 3-5 bibliography entries so that our scientists will have a easy time tracking down more information on each topic.

My department head charged me with taking the lead on this initiative. So, I am writing to you to ask for your help in writing several of these articles. Specifically, I need at least one article (and at most two) on each of the following topics:
1. How to visualize functions of several variables: level sets, contour plots, and transformations

2. The significance of partial derivatives, directional derivatives, and the gradient vector

3. When to use polar, cylindrical, or spherical coordinates to solve integration problems

4. Local and global extrema (the math behind the least squares method)

5. Why you should care about integration: average value, (center of) mass, and (your favorite application here—surprise me)

6. An introduction to potentials, vector fields, and path independence

We have no shortage of calculus textbooks in our research library here at Advanced Game Design. So, we are not in need of pages and pages of boxed equations. Rather, we are looking for article that one can read (not decipher!) and come away with a general sense of why these topics are important. There should be two completely worked examples of how to solve a problem— but don’t get carried away— rather refer the reader to one or more of your bibliography entries for additional examples.

If you choose to accept this contract, then I need your articles by Friday, April 26. I look forward to your reply.

Victor E. Player
Senior Scientist
Advanced Game Design