

Project 4: Applications of Derivatives

As with other group projects, you can do this project in a group and just submit one copy for the whole group. Be sure to mark the names of who created each problem, solved and explained, as you work through the project.

To do this project, we need to choose one of the following topics and read and work through the examples in the lecture notes:

1. differentials
2. related rates
3. optimization problems

Select one of these topics. You may want to choose the topic that seems most relevant to your future career or life goals. Then, for the topic that you have picked:

- a) Write three “real world” questions that use the topic that you have chosen to solve a problem in either your chosen career field, or in an area in which you have particular interest. In creating these problems:
 - You can use problems that you find in the lecture notes, in the textbook, or online as a basis for creating your own questions, but the questions you create **must be your own**.
 - You will get extra points if you are more creative in the questions that you choose.
 - Try to pick questions for which the topic you have chosen would be a reasonable approach to solving them—for example, if you use differentials to approximate something that is easy to calculate directly, this would be a case where no one would actually use differentials in the real world, and therefore isn't a great example (if you end up with this kind of example, try to modify it to make a differentials approach more reasonable).
 - Be sure that the questions that you choose can be solved using the methods you have chosen (if they don't seem to be solvable using the method you have selected, try modifying the problem).
 - If you have trouble finding realistic “real world” values and/or equations to represent the topic you are interested in modeling, you can make up values and/or equations in your problems—just try to make them realistic. (For example, don't pick a sine or cosine function to model something like the number of sales of an item as a result of the selling price, since this relationship is not typically periodic.)
- b) For each of the three problems you have selected, solve each problem step-by-step, in the role of the “prover”.
- c) Then for each of the three problems, explain each step, in the role of the “explainer”.