

Big Ideas of Optimization

We have a function that we want to optimize, that is we want to minimize it (as in cost) or maximize (as in profit).

- Draw a picture of what the word problem is asking for, if it is possible to do so, labeling variables.
- Decide what quantity (that is function) needs to be maximized or minimized.
- Assign variables to the other quantities that may vary.
- Determine the “objective equation,” the expression of what we are trying to optimize in terms of the variables we had previously defined.
- Determine the “constraint equation,” that is how the variables we defined relate to each other.
- Plug the “constraint equation” into the “objective equation” to get a function in terms of just one variable.
- Take derivatives to find the extreme points.
- Also check the endpoints to determine if a minimum or maximum may occur there.
- Make sure your answer makes physical sense! For example, if you are trying to optimize the area enclosed by a fence and you get that the fence should be -8 feet, something is wrong.