For each of these problems, follow the framework we discussed in class:

- Identify the quantity you want to maximize or minimize.
- Express this quantity algebraically, as the *fundamental equation.*
- This will often involve two variables, so you use some other *side condition* to reduce the fundamental equation to be in terms of one variable.
- Pay attention to the domain of the function to see if you need to check endpoints!
- Now optimize like before: Find critical points on the interval, etc

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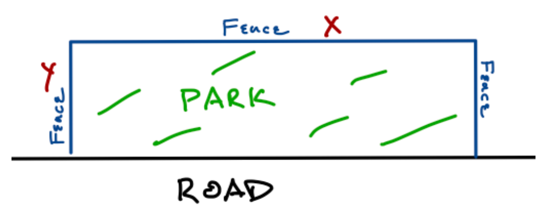
1. The city from Monday's class has another project to build a park similar to that example (cf. March 21 in-class): The park will be along a major road, and it will be fenced off on the three non-road sides. For this project, they do not have a predetermined area for the park, but they have 300 meters of fence to use for this project.

   (a) What is the largest possible area for the park?

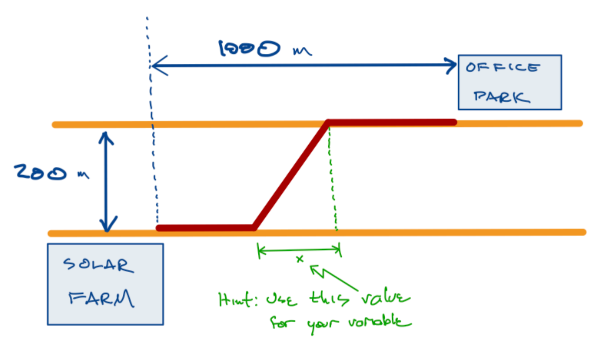
   (b) What are the dimensions of the park in this case?




2. A utility company is planning to run a cable from a solar farm on one side of a river to an office park on the other side. It costs \$4 per meter to run the cable over land, while it costs \$5 per meter to run the cable under water. Suppose the river is 200 meters wide and the office park is 1000 meters downstream from the solar farm.

   (a) What is the most economical way to lay the cable?

   (b) How much will it cost?




3. The utility company still wants to run a cable from the solar farm to the office park as in #2, but due to river flooding becoming more unpredictable, they have adjusted the cost to lay the cable under water. It now costs \$6 per meter run cable under water but still \$4 per meter to run the cable over land.

   (a) What is the most economical way to lay the cable in this scenario?
   Compare your answer to your answer in 3(a). Does this make sense?

   (b) How much will it cost?