Section 3.7 Optimization

An optimization problem is essentially a word problem which asks you to maximize or minimize a certain quantity. Nearly all optimization problems can be solved by employing a fixed strategy. It goes something like this:

- Read and re-read the problem until you understand it. In particular, make sure you know the quantity you are being asked to maximize or minimize.

- Draw and label a picture which gives the relevant information.

- Write equations that describe
  (a) the quantity you are attempting to maximize/minimize in terms of other variables which appear in your drawing, and
  (b) the constraints that your variables must obey

- Solve Equation in part (b) above for one of the variables, and plug this result back into Equation in part (a).

- Determine the "domain" of your function. This is very important!

- Find the extrema
  either using the Extreme Value Theorem(EVT) (if your domain is a closed interval)
  or use One-critical-value Extrema Theorem (to be introduced in this section later)