

MA 231, Guided Notes §4.3b

Recall:

The optimization problem process:

1. Read the problem carefully – several times if necessary – until you understand the quantity that is to be optimized.
2. With the aid of a large picture or diagram if appropriate, turn the information in the problem into equations.
 - (a) The equation to be optimized is called the *fundamental*, or *target* equation.
 - (b) Other equations are often called the *constraints*.
3. If necessary, use the constraint to turn the fundamental equation into an equation with just one variable.
4. Find the extreme values of the function using techniques from chapter 3.
5. State your solution in the context of the problem with appropriate units.

Example 1: Find the dimensions of the cylindrical can with volume 354 ml (12 oz.) that uses the minimum amount of material.

Example 2: We have a rectangular piece of cardboard that is 12 inches by 10 inches. To make a box, we cut out a square from each of the four corners and fold up the sides. Find the height of the completed box that has maximal volume.

Example 3: An arched window is being built such that its outline appears to be a semicircle on top of a rectangle. If there are 10 feet of framing material what must the dimensions of the window be to let in the most light?