

Worksheet #24: Applied Optimization Problems

Basic Guidelines:

Step 1: Draw and label a figure appropriate for the problem.

Step 2: Write down the equation that defines the quantity to be maximized or minimized.

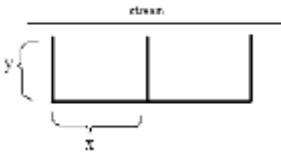
Step 3: If the equation is in terms of two variables, find a second equation so that the first equation can be put into terms of one variable.

Step 4: Find the domain where the quantity is defined. (An open or a closed interval?)

Step 5: Check for absolute extrema of the quantity.

1. An open top box with a square base is made from a square piece of cardboard by cutting out the corners and folding up the sides. If the dimensions of the cardboard are 12 inches by 12 inches, then what size cut will maximize the volume and what is the absolute maximum volume?

2. A farmer wants to fence in two adjacent fields alongside a stream. (See picture.) If the side alongside the stream does not need to be fenced in, find the dimensions that will maximize the area of the fields if there is only 1200 ft of fencing available.



3. A cylindrical container, open at the top is to hold 500 cubic centimeters of water. Find the height and radius that minimize the amount of material to manufacture the container and the absolute minimum area.