

Some max-min practice problems:

1. A photographer has a thin piece of wood 16 inches long. How should he cut the wood to make a rectangular picture frame that encloses the maximum area?
2. A rancher has a total of 12 miles of fencing with which to enclose a rectangular pasture. He plans to fence the entire area and then to subdivide it by running a fence across the width. What dimensions should the pasture have in order to enclose the maximum area with the available fencing?
3. Find the area of the largest rectangle with lower base on the x -axis and upper vertices on the curve $y = 6 - x^2$.
4. A retailer knows that if he charges x dollars for an alarm clock, he will be able to sell $480 - 40x$ clocks. The alarm clock costs him \$4 per clock. How much should he charge per clock in order to maximize his total profit?
5. Referring to the previous problem: If the government adds a tax of \$1 to the price of each clock, how much should the retailer now charge in order to maximize profit?
6. A rectangular trough is formed from a piece of metal 12 inches wide and of unknown length. What should the dimensions be to maximize the amount of water carried?
7. You wish to construct a tomato can out of 100π square inches of metal. What is the volume of the largest can that you can construct? (Hint: use x for the radius of the can, and y for its height. Find the volume in terms of these variables.)
8. You wish to construct a beer can (as in the previous problem). This means that the top and bottom must be double thickness. What is the largest can that may be constructed out of 100π square inches of metal?
9. A flower bed is to be formed in the shape of a semicircle on top of a rectangle. The flower bed is then to be fenced in with 200 ft of available fence. What should be the dimensions of the flower bed in order to yield the largest area?
10. A printing company plans to have 40 sq in of printed matter per page in a particular book. Each page is to have margins of 1.25 in on the sides and 1.5 in on the top and bottom. What are the most economical dimensions for the pages in terms of the cost of the paper?