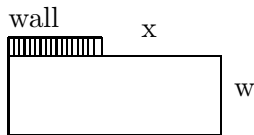


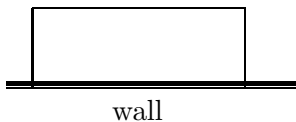
Section 5.6: Optimization

1. Find two positive numbers whose product is 36 and the sum of the first number and 4 times the second number is a maximum.

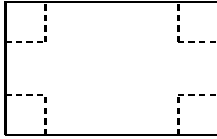
2. Starting with a 100-foot-long stone wall, a farmer would like to construct a rectangular enclosure by adding 400 feet of fencing as shown in the figure. Find the values of x and w that result in the greatest possible area.



3. A farmer wishes to enclose a rectangular field of area 500 square feet using an existing wall as one side. The cost of the fence is \$3 per foot. Find the dimension that will minimize the cost.



4. An open box (a box without a top) is to be made from a 9 inch by 12 inch piece of cardboard by cutting out identical squares from each corner. What size squares should be cut out of each corner so that the volume is maximized?



5. A manufacturer must produce a sturdy rectangular container with a square base and a volume of 128 cubic ft. The cost of the material for the top and 4 sides is \$2 per square foot while the cost of the material for the bottom is \$6 per square foot. Find the dimension of the box that will minimize the cost of the material.
6. A charter flight charges a fare of \$200 per person plus \$4 per person for each unsold seat on the plane. The plane holds 100 passengers. How many people would maximize the revenue? What is the maximum revenue?

7. Bob has been giving motivational seminars. When he charges \$600 per person, 1000 people will attend. For each \$20 decrease in the fee, an additional 100 people will attend the seminar. How much should Bob charge for the seminar so that he will maximize his revenue?

Inventory Problems:

8. A large pharmacy has an annual need for 480 units of a certain antibiotic. It costs \$4.65 to store one unit for one year. The fixed cost of placing an order amounts to \$31. Find the number of units to order each time, and how many times a year the antibiotics should be ordered.
9. A bookstore has an annual demand for 150,000 copies of a best-selling book. It cost \$0.15 to store one copy for one year, and it cost \$50 to place an order. Find the number of books that the bookstore should order each time, and how many times a year the books should be ordered.