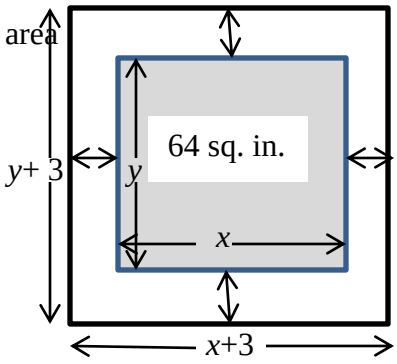
MA 22000 Lesson 33 Notes
3rd part of section 3.4 and section 3.5

We will continue to use the same guidelines for finding maximum or minimum values as in the previous two lessons.

Example 1:
A rectangular page is to contain 64 square inches of print. The margins at the top and the bottom and on each side are to be 1 ½ inches. Find the dimensions of the page that will minimize the amount of paper used (minimize area of the paper).

Let x = the width of printed area, y = length of printed area

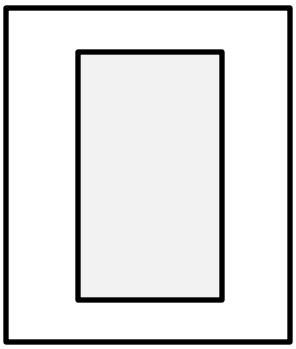


Area to be minimized: $A = (x+3)(y+3)$

Secondary equation: $xy = 64 \rightarrow y = \dfrac{64}{x}$

After substitution: $A = (x+3)\left(\dfrac{64}{x}+3\right)$

Example 2:
A rectangular page is to contain 24 square inches of print. The margins at the top and bottom of the page are each 1 ½ inches wide. The margins on each side are 1 inch. What should the dimensions of the page be so that the least amount of paper is used (minimize area of paper)?



Example 3:
Find the number of units that must be produced to maximize the revenue function $R = 600x^2 - 0.02x^3$. What is that maximum revenue?

Example 4: The marketing department at a business has determined that the demand for a product (price of the product) can be modeled by $p = \frac{40}{\sqrt{x}}$. The cost of producing x units of the product is given by $C = 2x + 50$ (in dollars).

a) Write a revenue function, then a profit function.

b) Find the critical values and make a sign chart.

c) Determine the price that will yield a maximum profit.

Example 5:
A commodity has a demand function modeled by $p = 6000 - 0.4x^2$ and a total cost function modeled by $C = 2400x + 5200$. What price yields a maximum profit?