Using known formulas:

1. For a rectangle with perimeter 20 to have the largest area, what dimensions should it have?

2. For a rectangle with area 100 to have the smallest perimeter, what dimensions should it have?

3. I want to fence in a rectangular vegetable patch. The fencing for the east and west sides cost $4 per foot, and the fencing for the north and south sides cost only $2 per foot. I have a budget of $80 for the project. What is the largest area I can enclose?

4. My orchid garden is adjacent to my house so that the house itself forms the northern boundary. The fencing for the southern boundary costs $4 per foot, and the fencing for the east and west sides cost $2 per foot. If I have a budget of $80 for the project, what is the largest area I can enclose?

5. The revenue function for the Acme Tissue Company is given by \( R(x) = x(100-x^2) \) where \( x \) is the cost of one case of tissues. As what price should tissues be sold in order to maximize revenue?

Homework: Section 3.7 Problems 9, 11, 19, 20, 60 (Hint for 60b: Growth rate is represented by the first derivative. Change in growth rate is represented by the second derivative.)
Even Answers: 20) 25 by 100/3 60) a) \( s = 40 \), b) \( s = 20 \)
1. Find two positive numbers such that their product is 162 and the sum of the first plus twice the second is a minimum.

2. Chocolate Box Company is going to make open-topped boxes out of 6-inch by 16-inch rectangles of cardboard by cutting squares out of the corners and folding up the sides. What is the largest volume box it can make this way?

3. A packaging company is going to make open-topped boxes, with square bases, that hold 108 cubic centimeters. What are the dimensions of the box that can be built with the least material?

4. The U.S. Postal Service will accept packages only if the length plus girth is no more that 108 inches. (Girth is the circumference of the package). Assuming that the front face of the package (as shown in the figure) is square, what is the largest volume package that the postal service will accept?

5. An offshore oil well is 5 KM off the coast. The refinery is 8 KM down the coast. Laying pipe in the ocean is twice as expensive as on land. What path should the pipe follow in order to minimize the cost? Hint: the cost of laying pipe on land = k, under water = 2k.

Homework: Section 3.7 Problems 21, 27, 54
Even Answers: 54) $2/\sqrt{3}$