Calculus 12 8-6 Applied Maximum and Minimum Problems

1. Find two positive numbers with product 200 such that the sum of one number and twice the second number is as small as possible.

2. Show that a rectangle with given area has minimum perimeter when it is a square.

3. A box with an open top is to be constructed from a square piece of cardboard, 3 m wide, by cutting out a square from each of the four corners and bending up the side, as indicated in the figure. Find the largest volume that such a box can have.



4. The lifeguard at a public beach has 400 m of rope available to lay out a rectangular restricted swimming area using the straight shoreline as one side of the rectangle.

a) If she wants to maximize the swimming area, what will the dimensions of the rectangle be?

b) To ensure the safety of swimmers, she decides that nobody should be more than 50 m from shore. What should the dimensions of the swimming area be with this added restriction?

5. Find the point of the line y = 5x + 4 that is closest to the origin.