Math 1205 Calculus/Sec. 4.7 Optimization Problems

I. Word Problems

A. Steps to solve
   1. Draw a picture when applicable.
   2. Determine if you are maximizing or minimizing the problem.
   3. Summarize information found in the problem.
   4. Determine the formula/function that applies.
   5. Write the function you obtained in step 3 in terms of one variable.
   6. Determine the domain of the function in step 4.
   7. Determine the critical points.
   8. Test to determine the extrema
   9. Did you answer the question asked?

B. Examples:
   1. What is the largest possible area for a right triangle whose hypotenuse is 5 cm long?
   2. Farmer Brown has 200 ft of fencing to enclose a rectangular field. What is the largest possible area that he can enclose if he makes 2 side by side corrals by adding a piece of fencing parallel to the shorter side?
3. Four feet of wire is to be used to form a square and a circle. How much of the wire should be used for the square and how much should be used for the circle to enclose the maximum area?

4. An open box with the capacity of 36,000 cubic inches is needed. If the box must be twice as long as it is wide, what dimensions would require the least amount of material?
5. A metal cylindrical container with a closed top is to hold $1\text{ft}^3$. Find the dimensions, which require the least amount of material.