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. Minimize \( F = x^2 + y^2 \) subject to \( x^2y^2 = 16, \ x, y > 0 \).
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 a single pen using a side of the barn as one side of the pen.

3. Assume that it costs Microsoft approximately $C(x) = 14,400 + 550x + 0.01x^2$ dollars to manufacture $x$ Xbox 360s in a day. How many Xboxes should be manufactured in order to minimize average cost? What is the resulting average cost of an Xbox? (give answer to the nearest dollar.)
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 covered box is to be made from a rectangular sheet of cardboard 5'x8'. What are the dimensions that will maximize the volume? What is that maximum volume?
6. What is the largest possible area for a right triangle whose hypotenuse is 5 cm long?

7. A metal cylindrical container with a closed top is to hold 1 $ft^3$. Find the dimensions, which require the least amount of material.