[3]

Solve each of the following optimization problems by **completing Steps 0-6**. Clearly indicate what each variable represents.

Before completing steps 5-6, compare your result from step 4 with your answer from the Preparation Worksheet. If they do not match, determine whether it is merely because you labeled your variables differently than I did or whether something is incorrect in your set-up of Steps 0-4.

1. Find two positive numbers whose product is 100 and whose sum is a minimum.

2. A farmer with 750 feet of fencing wants to enclose a rectangular area and then divide it into four pens with fencing parallel to one side of the rectangle. What is the largest possible total area of the four pens? [11]

3. Suppose 1200 square centimeters of material is available to make a box with a square base and an open top. Find the largest possible volume of the box. [15]

4. Find the point on the line y = 2x + 3 that is closest to the origin.

[21]

5. Find the point(s) on the ellipse $4x^2 + y^2 = 4$ that are farthest away from the point (1,0). [23]

6. A cylindrical can without a top is made to contain a *fixed* volume V. Find the dimensions that will minimize the amount of material used in the can. [The answer will contain V.] [xx]