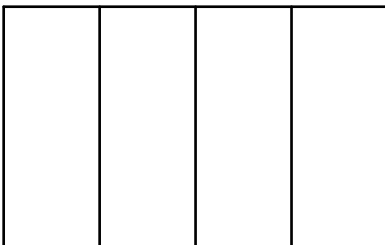


Solve the following problems. Show your work neatly organized in the space provided. Express irrational solutions rounded to three significant digits.

1. A rectangular box with a square base is to have a capacity of 100 cubic feet. If the material for the top costs \$1.40 per square foot, the material for the sides cost \$2.50 per square foot, and the material for the bottom costs \$2.60 per square foot, then what dimensions will minimize the total cost of the materials?

2. A farmer wishes to fence in a rectangular plot of land and to divide it into four equal areas using three lengths of fencing parallel to two opposite sides. (Please see the diagram below.) If the total fenced in area is to be one thousand square yards, then what dimensions will minimize the amount of fencing needed?



Calculus Worksheet #6 Unit 2 page 2

Solve the following problems. Show your work neatly organized in the space provided. Express irrational solutions rounded to three significant digits.

3. A manufacturer finds that if he produces a total of n items per week, his total weekly profit, P , (in dollars) is given by the equation $P = 60n - 0.3n^2 - 750$.

- (a) What weekly production will maximize the total profit. What is the maximum total profit? What is the profit per item produced in this case?
- (b) What weekly production will maximize the profit per item produced? What is the maximum profit per item produced? What is the total profit in this case?

4. A printed page must contain 48 square inches of printed material with a 0.75 inch margin at the top and on both sides and a 1.25 inch margin at the bottom. What dimensions must the page have in order to minimize the amount of paper used?