

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

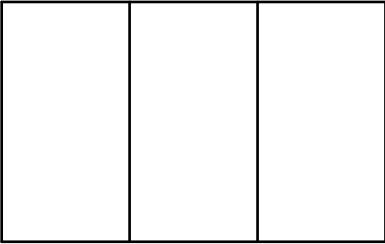
**1. A rectangular bin is to be built so that it has a square base and has a capacity of 120 cubic feet. If the material for the top costs 40 cents per square foot, the material for the sides cost 70 cents per square foot, and the material for the bottom costs 60 cents per square foot, then what dimensions will minimize the total cost of the materials?**

**2. A printed page must contain 37.5 square inches of printed material with a 1 inch margin at the top and on both sides and a 2 inch margin at the bottom. What dimensions must the page have in order to minimize the amount of paper used?**

## Calculus Class Worksheet #5 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 farmer wishes to fence in a rectangular plot of land and to divide it into 3 equal areas using two lengths of fencing parallel to two opposite sides. (Please see the diagram below.) If the total fenced area is to be 1800 square yards, then what dimensions will minimize the length of fencing needed?



4. A manufacturer finds that if she produces  $n$  items per week, her total profit,  $P$ , (in dollars) is given by the function  $P = 60n - 0.5n^2 - 400$ . Find the weekly production,  $n$ , that corresponds to a maximum profit per item. What is the maximum profit per item?