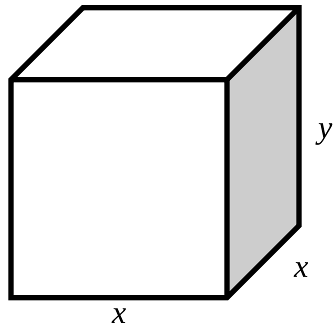
MA 15910, Lesson 32 Notes
Section 6.2 (part 3)

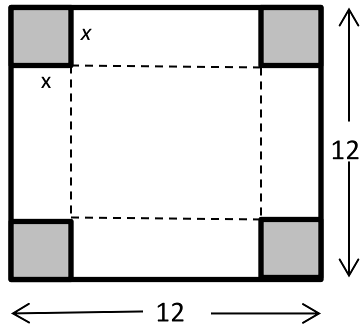
Example 1:

An expensive closed box with a square base is to have a volume of 24,000 cubic centimeters. The material for the top and bottom of the box cost \$0.02 per square centimeter, while the material for the sides of the box cost \$0.015 per square centimeter. Find the dimensions of the box that will lead to the minimum total cost. What is the minimum total cost? (Round the dimensions to the nearest tenth of a centimeter. Round the minimum total cost to the nearest cent.) Let x = the length of each side of the base, y = height of the box



Cost is to be minimized.

<u>Example 2</u>: An open-topped box is to be made from a 12 inch square piece of cardstock by cutting equal sizes squares of length x from its corners, turning up the sides, and taping. Find the <u>area of the base</u> of the box and the <u>volume of the largest box</u> that can be made. (Maximize volume.)

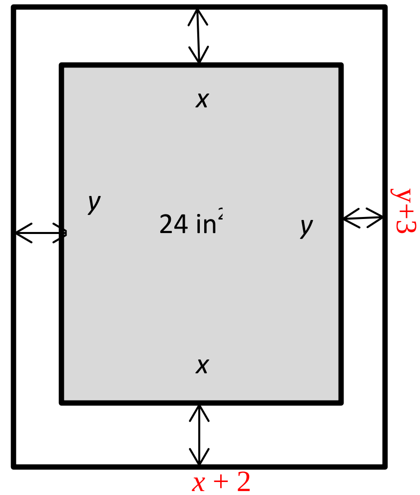


3D picture after folding up and taping sides.

Length & width = $12 - 2x$

Example 3:
A book is to contain 24 square inches of print per page, with margins of 1 inch along the sides of a page and 1 ½ inch along the top and bottom of the page. Find the dimensions of the page that will require the minimum amount of paper (minimum area).

Minimize area of the paper.



Example 4:

A small business uses a minivan to make deliveries. The cost per hour for fuel is $C = \frac{V^2}{600}$, where *v* is the speed or rate of the minivan (in miles per hour). The driver is paid $10 per hour. Find the speed that minimizes the cost of a 100-mile trip. (Assume there are no costs other than fuel and wages for the driver.) Remember $d = rt \ or \ d = vt$. Round your speed to the nearest tenth.