

Notes

Examples

Example 1. An airline places a restriction for the size carry-on luggage to a maximum of 68 inches for the length and girth combined. What is the maximum volume you can have in a carry-on given this constraint?

Example 2. The volume of a soup can is about 95π milliliters. What is the least amount of material required to make a can? (You may assume that a soup can is a perfect cylinder with uniform thickness.)

Example 3. Because all the stores stopped selling boxes, you decide to make a rectangular box with a volume of 19 cubic feet. The material for the top and bottom costs 8 dollars per square foot, and the material for the 4 sides costs 3 dollars per square foot. To the nearest cent, what is the minimum cost for such a box?

Example 4. A manufacturer is planning to sell a new product at the price of 400 dollars per unit and estimates that if x thousand dollars is spent on development and y thousand dollars is spent on promotion, consumers will buy approximately $\frac{110y}{y+5} + \frac{260x}{x+8}$ units of the product. If manufacturing costs for the product are 230 dollars per unit, how much should the manufacturer spend on development and how much on promotion to generate the largest possible profit?