

1. A pizza maker finds that he can sell 600 slices of pizza at a price of 90 cents each. He also finds that for each cent he lowers the price he will sell 4 more slices of pizza and that for each cent he raises the price, he will sell 4 fewer slices of pizza. He produces the slices of pizza at a cost of 40 cents each to himself. What price should he charge to maximize his profit?
2. (Based on actual events as reported in the Red & Black) After buying a mansion in the Athens area, Britney Spears decides to build a cylindrical recording studio on the grounds of the mansion. The bottom of the studio is to be made of a material that costs 3 dollars per square yard, the top is to be made of a material costing 1 dollar per square yard, and the side is to be made of a special soundproofing material that costs 40 dollars per square yard. The total cost of the material for the studio is to be 1200π dollars. What dimensions will maximize the volume of such a studio?
3. A piece of wire 80 inches long is cut into at most two pieces. Each piece is shaped into a square. How should the wire be cut so that to minimize the area(s) of the square(s)? How should the wire be cut so that to maximize the area(s) of the square(s)?
4. Find the maximum possible area of a rectangle with diagonals of length 16.