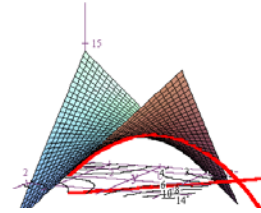


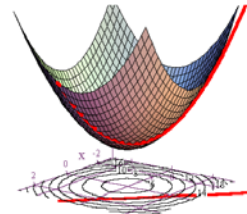
LAGRANGE MULTIPLIERS

Use the method of Lagrange multipliers to solve the following problems.

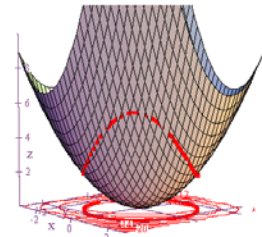
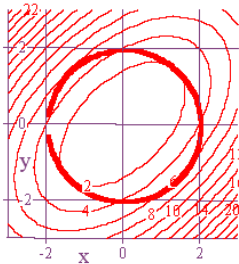
- Find the coordinates of the maximum point on the graph of $z = xy + 5$ subject to the constraint $x + y = 2$.



- Find the coordinates of the minimum point on the graph of $z = x^2 + y^2 + 5$ subject to the constraint $x + y = 2$.



- Find the coordinates of the extreme points on the graph of $z = x^2 - xy + y^2$ subject to the constraint $x^2 + y^2 = 4$.



- Let $w = xyz$ for $x \geq 0$, $y \geq 0$, and $z \geq 0$. Find the maximum volume subject to the constraint $x + y + z = 100$.
- A manufacturer has an order for 1000 ultra-deluxe time machines with built-in MP3 player. Suppose the units are manufactured in two different locations with x representing the number of units produced in one location and y the number of units in the other. If the total cost of production is given by $z = C(x, y) = x^2 + 10x + 0.50y^2 + 12y - 10,000$ dollars, find the values of x and y that will minimize the costs and find the minimum cost.