

Written HW7 – MATH 3503 Fall 2022

In this homework you will do optimization using the Lagrange multiplier method. Recall that if you want to optimize the function f subject to the constraint $g = k$, then you simply solve the system

$$\begin{cases} \nabla f = \lambda \nabla g \\ g = k \end{cases}$$

1. Optimize $f(x, y) = 2x + 2xy + y$ subject to the constraint $2x + y = 100$.
2. Let $T(x, y, z) = 10 + x^2 + y^2$ represent the temperature of each point on the sphere $x^2 + y^2 + z^2 = 17$. Find the max temperature on the curve formed by the intersection of the sphere with the plane $y - z = 0$. (*hint: solve the plane for z and plug it into the sphere equation*)