

Use Lagrange multipliers to solve the following.

1. A rectangular box without a lid is to be made from 6 m^2 of cardboard. Find the dimensions of the box that maximize the volume.
2. Find the maximum and minimum values of $f(x, y) = 2x^2 + 3y^2 - 4x - 5$ on the disk $x^2 + y^2 \leq 16$.