MATH 2574 (Calculus III)
due Fri 3 Mar 2017

Take-Home Quiz 4:
Optimization and Lagrange multipliers (§12.8-12.9)

Directions: This quiz is due on March 3, 2017 at the beginning of lecture. You may use whatever resources you like – e.g., other textbooks, websites, collaboration with classmates – to complete it **but YOU MUST DOCUMENT YOUR SOURCES**. Acceptable documentation is enough information for me to find the source myself. Rote copying another's work is unacceptable, regardless of whether you document it.

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1. **12.8 #36/ 12.9 #41** A lidless box is to be made using 2 m^2 of cardboard. Find the dimensions of the box with the largest possible volume using the following methods:
   (a) Use techniques from §12.8 for optimizing functions of two variables.
   (b) Use Lagrange multipliers.
2. **12.8 #38/ 12.9 #43** Find the dimensions of the largest rectangular box in the first octant of the xyz-coordinate system that has one vertex at the origin and the opposite vertex on the plane $x+2y+3z = 6$, using the following methods:
   (a) Use techniques from §12.8 for optimizing functions of two variables.
   (b) Use Lagrange multipliers.