Teaching Assitant

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Office hours:

Wednesday / Friday 11:45 AM - 12:45 PM
McHenry Library Cafe

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Reflection

Take a moment to think about what was covered last class and what is due on upcomming assignments. Which concepts, techniques, etc. feel clear and doable? Which, if any, could use more explanation or practice?

Warm Up

Discuss the following with your groups

Give plain language definitions for the following terms:

- Optimization
- Constraint
- Riemann Sum
- Domain

Answer the following questions:

- What is the relationship between gradients and level sets?
- What, exactly, is a Lagrange multiplier?

Problems 1 and 2 (Lagrange Multipliers)

Problem 1 (10.8.3)

Find the absolute maximum and minimum of the function $f(x, y) = x^2 + y^2$ subject to the constraint $x^4 + y^4 = 1$.

Problem 2 (10.8.10)

Find the maximum and minimum volumes of the rectangular box whose surface area equals 9000 square cm and whose edge length (sum of lengths of all edges) is 520 cm.

Problems 3, 4, 5, and 6 (Riemann Integrals)

Problem 3 (11.1.1)

Suppose $f(x,y) = 1 - x^2 - y^2$ and R is the rectangle with vertices at $(0,0)$ and $(6,4)$. For the Riemann integral $\iint_R f(x,y)\,dA$, under- and overestimate by Riemann sums — from top right or bottom left corners — when

- R is not subdivided.
- R is partioned into four equal-sized rectangles.

Problem 4 (11.2.2)

Evaluate $\int_1^2 \int_3^4 (2x+y)^{-2}\,dydx$.

Problem 5 (11.2.3)

Evaluate $\int_1^4 \int_8^{14} (x+\ln y)\,dydx$.

Problem 6 (11.2.4)

Evaluate $\int_2^3 \int_1^6 xye^{x+y}\,dydx$.

Problem 7 (11.3.5)

The region W lies below the surface $f(x,y) = 7e^{-(x-3)^2-y^2}$ and above the disk $x^2 + y^2 \leq 16$ in the xy-plane.

(a) Think about what the contours of f look like. You may want to use $f(x,y) = 1$ as an example. Sketch a rough contour diagram on a separate sheet of paper.

(b) Write an integral giving the area of the cross-section of W in the plane $x = 3$.

(c) Write an iterated double integral giving the volume of W.

Attendance