Math 53 (Multivariable Calculus), Section 102 & 108
Week 8, Wednesday
Oct 12, 2022
For the other materials: seewoo5.github.io/teaching/2022Fall

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1. Find the absolute maximum and minimum of the function $f(x, y) = x^2 + y^2 - 2x + 1$ on the disk $D = \{(x, y) | x^2 + y^2 \leq 4\}$. Can you find them without using partial derivatives?

2. Let $H = -x \ln x - y \ln y - z \ln z$.

   (a) Assume that x, y, z are positive and $x + y + z = 1$. Express H as a function in x and y only.

   (b) Find maximum value of H. For what values of x, y, z does it occur?

   (c) Use Lagrange multiplier to derive the same conclusion without expressing H as a two variable function.

   The function H is called *Shannon's entropy*.