

Lecture on Jul. 11th, 2017: Multivariable Calculus II: Double Integrals I

1 Warm-up Practice

- Minimize and Maximize $f(x, y) = x + e^y$, subject to $x^2 + y^2 = 1$.

2 Double Integrals over Rectangular Regions

- Definition of Double Integrals over Rectangular Regions.
- Example: $\int_0^1 \int_0^1 (2xy + 3x^2) dx dy$, $\int_0^1 \int_0^1 (1 + x^2 + y^2) dx dy$ and $\int_0^1 \int_0^1 1 dx dy$.
- Definition of Average Value over Rectangular Regions.
- Geometrical Interpretations of Double Integrals over Rectangular Regions.

3 Regular Region

- Definitions of Regular x Region and Regular y Region.
- Example: $R = \{(x, y) | x - 2 \leq y \leq 4 - x^2, 0 \leq x \leq 2\}$, express it as regular y region.