

13 MULTIPLE INTEGRALS

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August 23, 2020

1 Double Integrals

The simplest sort of multiple integrals is the *double integrals*

$$\iint_R f(x, y) dA$$

of a continuous function $f(x, y)$ over the *rectangle*

$$R = [a, b] \times [c, d] = \{(x, y), a \leq x \leq b, c \leq y \leq d\}$$

in the xy -plane

To define the *value*

$$V = \iint_R f(x, y) dA$$

of such a double integral, we begin with an approximation to V . To obtain this approximation, the first step is to construct a **partition** \mathcal{P} of R into subrectangles $R_1, R_2, R_3, \dots, R_k$ determined by points

$$a = x_0 <$$