Mathematics II – Examples

III.6. Applications of triple integrals

Example 364: Show, that volume of the region $T = \{[x, y, z] \in \mathbb{E}_3 : [x, y] \in B \subset \mathbb{E}_2, \ 0 \leq z \leq f(x, y) \}$ located "between" xy-plane and graph of the function $z = f(x, y)$, which is continuous on measurable set B in $\mathbb{E}_2$, can be computed using the double integral $\iint_B f(x, y) \, \mathrm{d}x \, \mathrm{d}y$.
(*Hint: use formula for solid volume* $V = \iiint_T 1 \ dx \ dy \ dz$.)