

Multiple Integration
Iteration of Double Integrals

Question

Find the volume of the given solid

Below $z = 1/(x + y)$ and over the region in the xy -plane bounded by $x = 1$, $x = 2$, $y = 0$ and $y = x$.

Answer

$$\begin{aligned} V &= \int_1^2 dx \int_0^x \frac{1}{x+y} dy \\ &= \int_1^2 dx \left(\ln(x+y) \Big|_{y=0}^{y=x} \right) \\ &= \int_1^2 (\ln 2x - \ln x) dx \\ &= \ln 2 \int_1^2 dx = \ln 2 \text{cu. units} \end{aligned}$$