

Multiple Integration

Double Integrals

Question

Evaluate the following double integral by inspection.

$$\iint_R \sqrt{b^2 - y^2} dA,$$

where R is the rectangle $0 \leq x \leq a$, $0 \leq y \leq b$.

Answer

$$\begin{aligned} \iint_R \sqrt{b^2 - y^2} dA \\ &= \text{volume of quarter cylinder} \\ &= \frac{1}{4}(\pi b^2)a = \frac{1}{4}\pi ab^2 \end{aligned}$$

