

Multiple Integration

Double Integrals

Question

Evaluate the following double integral by inspection.

$$\iint_{x^2+y^2 \leq a^2} \sqrt{a^2 - x^2 - y^2} \, dA$$

Answer

$$\begin{aligned} & \iint_{x^2+y^2 \leq a^2} \sqrt{a^2 - x^2 - y^2} \, dA \\ &= \text{volume of hemisphere} \\ &= \frac{1}{2} \left(\frac{4}{3} \pi a^3 \right) = \frac{2}{3} \pi a^3 \end{aligned}$$

