

Multiple Integration
Double Integrals

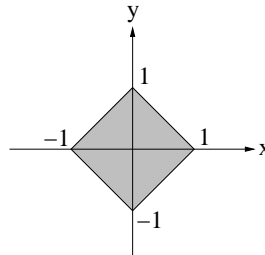
Question

Evaluate the following double integral by inspection.

$$\iint_{|x|+|y|\leq 1} (x^3 \cos(y^2) + 3 \sin y - \pi) dA$$

Answer

$$\begin{aligned} & \iint_{|x|+|y|\leq 1} (x^3 \cos(y^2) + 3 \sin y - \pi) dA \\ &= 0 + 0 - \pi(\text{area bounded by } |x| + |y| = 1) \\ &= -\pi \times 4 \times \frac{1}{2}(1)(1) = 2\pi \end{aligned}$$



(Each of the first two terms in the integrand is an odd function of one of the variables, and also the square is symmetrical about each of the coordinate axes.)