

Quiz 4, Section A01 Solutions

Compute the double integral over the region $D =$ unit disk

$$\iint_D \frac{x}{x^2 + y^2} dA$$

Solution:

$$\begin{aligned} \iint_D \frac{x}{x^2 + y^2} dA &= \int_0^{2\pi} \int_0^1 \frac{r \cos(\theta)}{r^2} r dr d\theta \\ &= \int_0^{2\pi} \int_0^1 \cos(\theta) dr d\theta \\ &= \int_0^{2\pi} r \cos(\theta) \Big|_0^1 d\theta \\ &= \int_0^{2\pi} \cos(\theta) d\theta \\ &= \sin \theta \Big|_0^{2\pi} \\ &= 0 - 0 \\ &= 0 \end{aligned}$$