

Determine

$$\iint_R f \, dA$$

where $R = [-1, 1] \times [-1, 1]$ and

$$f(x, y) = \begin{cases} 0 & x^2 + y^2 > 1 \\ \sqrt{1 - x^2 - y^2} & x^2 + y^2 \leq 1. \end{cases}$$