Vector calculus quiz

Calculate the flux \( \int \int \mathbf{V} \cdot d\mathbf{S} \) of the vector field

\[
\mathbf{V}(x, y, z) = (x, y, z)
\]

across one turn of the spiral ramp parametrized by

\[
\mathbf{R}(u, v) = (u \cos v, u \sin v, v),
\]

where \( 0 \leq u \leq 1 \) and \( 0 \leq v \leq 2\pi \).