1. Verify Stokes' Theorem for the vector field \( \mathbf{F}(x, y, z) = x^2 \mathbf{i} + y^2 \mathbf{j} + z^2 \mathbf{k} \), where \( S \) is the part of the paraboloid \( z = 1 - x^2 - y^2 \) that lies above the \( xy \)-plane and has upward orientation. That is, calculate both the line integral of \( \mathbf{F} \) around the boundary of \( S \) and the surface integral of curl \( \mathbf{F} \) on \( S \).
2. Verify the Divergence Theorem for the vector field \( \mathbf{F}(x, y, z) = x \, \mathbf{i} + y \, \mathbf{j} + z \, \mathbf{k} \), where \( S \) is the unit sphere \( x^2 + y^2 + z^2 = 1 \). That is, calculate both the surface integral of \( \mathbf{F} \) on \( S \) and the triple integral of \( \text{div} \, \mathbf{F} \) over the interior of \( S \).