Let 

\[ F(x, y, z) = \langle \cos(\sqrt{1 + x^7 + y^9}) , \tan(x^7 + y^2 + 1/z) , \tan^{-1}(e^{x+y} + \cos^6(x^8 - y + 3z)) \rangle , \]

and let \( \langle P, Q, R \rangle = \text{curl } F \). Compute

\[ \frac{\partial P}{\partial x} + \frac{\partial Q}{\partial y} + \frac{\partial R}{\partial y} . \]

Be sure to explain everything.

2. Calculate the surface integral

\[ \int \int_S \mathbf{F} \cdot d\mathbf{S}, \]

where

\[ \mathbf{F}(x, y, z) = \langle 2x + y + z , x + 2y + z , x + y + 2z \rangle \]

where \( S \) is the surface of the box bounded by the planes \( x = 0, x = 1, y = 0, y = 4, z = 0, z = 5. \)