Problem 1  (10 points) Given

\[ z = f(x, y) = 5e^{(5-\sqrt{x^2+y^2})} \]

(1) Find the equation for the tangent plane at \((-3, 4)\). (5 points)
(2) Estimate \(f(-3.01, 3.99)\) by linear approximation. (5 points)
Problem 2  (10 points) Given \( z^2 = x^2 + \sin y + \log z \)

(1) Find \( \frac{\partial z}{\partial x} \) and \( \frac{\partial z}{\partial y} \). (5 points)

(2) \( \vec{u} = \begin{bmatrix} \sqrt{2} \\ \sqrt{2} \end{bmatrix} \). Find \( \nabla \vec{u} \cdot \vec{z} \) at \((-1, \pi, 1)\). (5 points)