Q1. Find the domain and the range of \( f(x, y) = \ln(9 - x^2 - y^2) \). Describe the level curves of \( f \).

Q2. Find the limit, if it exists, or show that the limit does not exist.

\[
\lim_{(x,y) \to (0,0)} \frac{xy}{\sqrt{x^2+y^2}}, \quad \lim_{(x,y) \to (0,0)} \frac{x^3-xy^2}{x^2+y^2}
\]
Q3 Find the first partial derivatives of \( f(x, y) = \tan^{-1}(xy^2) \)

Q4 Assume that the equation \( \sin(x + y) + \sin(y + z) + \sin(x + z) = 0 \) defines \( z \) as a differentiable functions of \( x, y \). Find the values of \( \frac{\partial z}{\partial x} \) and \( \frac{\partial z}{\partial y} \) at \((\pi, \pi, \pi)\)