Q.1: Find the limit \( \lim_{(x,y) \to (0,0)} \frac{3x^2 + \sin^2 y}{2x^2 + 3y^2} \) if exist, or show that limit does not exist.

Q.2: Find \( \frac{\partial z}{\partial x} \) and \( \frac{\partial z}{\partial y} \) for the function \( F(x, y, z) = 2x^2 + 3y^2 + 4z^3 - 5xy + 2xz - 3yz + 9 \).

Q.4: Find and sketch the domain of the function \( f(x, y) = \sqrt{x^2 + y^2 - 4} + \ln (25 - x^2 - y^2) \). Write the domain in words.
Q.3: Show that \( u(x,t) = \sin (x - at) + \ln (x + at) \) is a solution of the wave equation \( \frac{\partial^2 u}{\partial t^2} = a^2 \frac{\partial^2 u}{\partial x^2} \). 

Q.5: Show that \( f(x,y) = 2xe^{xy} \) is differentiable at the point \( P(2,0) \) and find the linearization \( L(x,y) \) of \( f(x,y) \) at the point \( P(2,0) \). Use \( L(x,y) \) to approximate \( f(2.1,-0.1) \). 

Q.6: If \( z = f(x,y) = 2x^2 + xy - 3y^2 \), find the differential \( dz \). If \( x \) changes from 1 to 1.1 and \( y \) changes from 2 to 2.05, compute the value of \( dz \).