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

\[ \lim_{(x,y) \to (0,0)} \frac{xy^4}{x^3+y^2} \]

2. Find the first partial derivatives of the function.

a) \( f(x, y) = \frac{ax + by}{cx + dy} \)

b) \( u(r, \theta) = \sin(r \cos \theta) \)

3. Find the domain of the function.

\[ f(x, y) = \ln(9 - x^2 - 9y^2) \]