MTH 265, Quiz #3, Summer 2024 Name _____

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Find the domain and range of $f(x,y) = \sqrt{9 - x^2 - 9y^2}$ and sketch the domain in the plane.

2. Consider the function $f(x,y) = \sqrt{x^2 - y^2}$. Convert the function to the indicated coordinate system or format.
   a. Write f in spherical coordinates.

   b. Write f in cylindrical coordinates.

   c. Write f in parametric surface form, $\vec{r}(u,v)$.

3. Find $\lim_{(x,y)\to(0,0)} \frac{xy^4}{x^2+y^8}$ if it exists or prove that it does not.