

**WRITE YOUR NAME:**

MAC 2313 B51 Spring 2024

Written homework #5

Due Tuesday February 13th, in Canvas

**Question 1.** Find the domain of the function  $f(x, y, z) = \ln(16 - x^2 - y^2 - z^2)$ .  
(Geometrically, what does the domain look like as a subset of  $\mathbb{R}^3$ ?)

**Question 2.** Prove that the limit does not exist.

$$\lim_{(x,y) \rightarrow (0,0)} \frac{xy}{3x^2 + 4y^2}$$

**Question 3.** Find the domain of the function  $f(x, y) = \frac{x}{\sqrt{x^2 + y^2}}$ .

Does the limit of  $f(x, y)$  exist as  $(x, y)$  approaches  $(0, 0)$ ?