Quiz 1

Multivariable Calculus

Question 1. Sketch the graph and level curves (for k = -1, 0, 1) of the given surface. Also describe level curves in words. [3 marks]

$$x^2 + \frac{y^2}{9} + \frac{z^2}{4} = 1$$

Question 2. Find and sketch the domain of the function. [2 marks]

$$f(x, y) = \sqrt{y} + \sqrt{25 - x^2 - y^2}$$

Question 3. Determine at what point the function is not continuous. [2 marks]

$$f(x, y) = \begin{cases} \dfrac{xy}{x^2 + xy + y^2} & \text{if } (x, y) \neq (0, 0) \\ 0 & \text{if } (x, y) = (0, 0) \end{cases}$$

Question 4. [3 marks]

$$f(x, y) = x^3 e^{-y} + y^3 \sec \sqrt{x}$$

Compute $\dfrac{\partial f}{\partial x}$ and $\dfrac{\partial f}{\partial y}$.

Find $\dfrac{\partial f}{\partial x}(1, 3)$.