

MATH 201 QUIZ 3

SECTION:

ID:

NAME:

1. Draw and describe the domain of the function

$$f(x, y) = \frac{\sqrt{4 - x^2 - y^2}}{x - y^2}.$$

2. Find the following limits if it exists or prove the nonexistence.

(1) $\lim_{(x,y) \rightarrow (1,1)} \frac{x^2 - xy}{\sqrt{x} - \sqrt{y}}.$

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

3. Compute $\partial z / \partial x$ at $(x, y, z) = (0, \pi/4, 1)$ from the implicit equation

$$2e^{xz} \cos^2(yz) = 1.$$

4. Compute the maximum rate of change of the function

$$f(x, y, z) = \tan^{-1}(xyz^2)$$

at the point $(1, 1, 1)$.