

## QUIZ 3

(Math 200-Section A)

1. Find the limits: (a)  $\lim_{(x,y) \rightarrow (\frac{\pi}{2}, 0)} \frac{\cos y - 2}{y - \sin x}$  (b)  $\lim_{(x,y) \rightarrow (1,1)} \frac{xy - y - 2x + 2}{x - 1}$  (4 pts)

2. Check whether the function  $f(x, y) = \frac{1}{x^2 - y}$  is continuous at  $(-1, 1)$ . Can you describe all points of discontinuity of  $f$ ? (4 pts)

3. By considering different paths of approach, show that the function  $f(x, y) = \frac{xy}{|xy|}$  has no limit as  $(x, y) \rightarrow (0, 0)$ . (4 pts)

4. Find the partial derivatives  $\frac{\partial f}{\partial x}$  and  $\frac{\partial f}{\partial y}$  of the function  $f(x, y) = e^{-x} \sin(x + y)$ . (4 pts)

5. Find the value of  $\frac{\partial z}{\partial x}$  at  $(1, 1, 1)$  if the equation  $xy + z^3x - 2yz = 0$  defines  $z$  as a function of the two independent variables  $x$  and  $y$ , and the partial derivatives exist. (4 pts)