

Math 280 Section C1 Quiz 1
January 26, 2000

Problem 1.

Consider the function $f : \mathbb{E}^2 \rightarrow \mathbb{E}^2$ defined as $f(x, y) = (x^2 - y, \cos(xy))$. Find the Jacobian determinant $J_f(x, y)$. [Give the details of your work.]

Solution

First we find the Jacobi matrix

$$f' = \begin{bmatrix} 2x & -1 \\ -y \sin(xy) & -x \sin(xy) \end{bmatrix}.$$

Therefore the Jacobian determinant is

$$J_f(x, y) = \begin{vmatrix} 2x & -1 \\ -y \sin(xy) & -x \sin(xy) \end{vmatrix} = (-2x^2 - y) \sin(xy).$$