

Math 53 Discussion Problems Oct 8

- For each of the following functions, find $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$.
 - $f(x, y) = (x^2 - 1)(y + 2)$
 - $f(x, y) = x^y$
- For each of the following functions, find all the second-order partial derivatives.
 - $f(x, y) = \sin(xy)$
 - $f(x, y) = \tan^{-1}\left(\frac{y}{x}\right)$
- Let $f(x, y) = \begin{cases} y^3, & \text{if } y \geq 0 \\ -y^2, & \text{if } y < 0 \end{cases}$
Find f_x, f_y, f_{xy}, f_{yx} .
- Find an equation for the tangent plane to the given surface at the specified point.
 - $z = 1 - x - y, (0, 1, 0)$
 - $z = 4x^2 + y^2, (1, 1, 5)$
- Find the linearization $L(x, y)$ of the given function at the specified point.
 - $f(x, y) = x^3y^4, (1, 1)$
 - $f(x, y) = e^x \cos y, (0, \frac{\pi}{2})$