

Worksheet for 2020-09-11

Problem 1. Let $z = f(x, y) = \sqrt{1 + xy}$. Rewrite z in terms of r, θ and compute $\partial z / \partial r$ and $\partial z / \partial \theta$ when $x = 6, y = 8, r = 10$. (Later on we will see how to do this using the chain rule.)

Let \mathbf{u} be the unit vector $\langle 3/5, 4/5 \rangle$. Compute $D_{\mathbf{u}}f(6, 8) = \langle f_x(6, 8), f_y(6, 8) \rangle \cdot \mathbf{u}$.

Problem 2. Consider the equation $yz + x \ln y + z^3 = 0$. This equation implicitly defines $z = f(x, y)$ as a function of x, y . Compute $f_x(3, 1)$ and $f_y(3, 1)$.