

$f(x, y)$ is diff. at (x_0, y_0)

$\Leftrightarrow f(x, y) = \text{linear function} + \text{"smaller"}$

Eg. $f(x, y) = \sqrt{x^2 + y^2}^{\frac{1}{2}}, (x_0, y_0) = (0, 0)$

What is the linear part?

Try to find $f_x(0, 0), f_y(0, 0)$

$(0, 0)$ Both do not exist!

$\Rightarrow$ linear part D.N.E. $\Rightarrow$ Not diff.