

Recall that we defined a function $f(x, y)$ to be *differentiable* at a point (a, b) provided that

$$\lim_{(x,y) \rightarrow (a,b)} \frac{f(x, y) - L(x, y)}{\sqrt{(x - a)^2 + (y - b)^2}} = 0$$

where $L(x, y)$ is the linear approximation to $f(x, y)$ at (a, b) .

Exercise 1. Use the definition above to show that the function $f(x, y) = x^2 + y^2$ is differentiable at every point (a, b) .