

# Lecture 10

Thursday, January 26, 2023 8:10 AM

\* Question

\* Quiz 1

Limit of a multivariable function

$$\lim_{x \rightarrow a} f(x) = L$$



$$\lim_{(x,y) \rightarrow (a,b)} f(x,y) = L$$



$f(x,y)$  can be made arbitrarily close to  $L$

as long as  $(x,y)$  is sufficiently close to  $(a,b)$ .

Because there are infinitely many "paths" for  $(x,y)$  to approach  $(a,b)$ , it is quite demanding to have  $f(x,y) \rightarrow L$  as  $(x,y) \rightarrow (a,b)$ .

meaning  $x \rightarrow a$  and  $y \rightarrow b$

$$\underline{\underline{\text{Ex}}}$$
$$\lim_{(x,y) \rightarrow (1,2)} (x+y) = 1+2=3$$

$$\lim_{(x,y) \rightarrow (2,5)} x^y = 2^5 = 8$$

$$\lim_{(x,y) \rightarrow (1,1)} \frac{x+y}{x-y} =$$

$$\lim_{(x,y) \rightarrow (1,1)} \frac{x+y-2}{x-y} =$$

$$\lim_{(x,y) \rightarrow (a,0)} \frac{x^3}{x^2 - y^2} =$$

$$\lim_{(x,y) \rightarrow (a,0)} \frac{x^3}{x^2 + y^2} =$$