Math 212 Spring 2020
Multivariable Calculus Written HW 2
Due Wednesday, February 5

1. Show that $\lim_{(x,y)\to(0,0)} \frac{y^3}{x^2+y^2} = 0$.

2. Show that the function $\lim_{(x,y)\to(0,0)} \dfrac{x+y}{x-y}$ does not exist. Hint: consider the line $y = mx$.

3. Let $f(x,y) = \dfrac{x^2}{x^2+y}$. Show that along any line $y = mx$ the limit as (x,y) approaches $(0,0)$ exists and is the same. Then use the curve $y = mx^2$ to show that $\lim_{(x,y)\to(0,0)} f(x,y)$ does not exist.