

Show all work. 5 points each.

1) Find and draw the level curves for $f(x, y) = xy$ for $k = -2, -1, 1, 2$

2) (4pts) Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2}{x^2 + y^2}$ does not exist by evaluating it along the lines $y = 0$ and $y = x$.

(1pt) If the limit does not exist does this mean that the limit along every path is different?