

Show all work. 5 points each.

1) Show that the limit $\lim_{(x,y) \rightarrow (0,0)} \frac{2x^2y}{x^4 + y^2}$ does not exist: Hint: Let $(x, y) \rightarrow 0$ along the curve $y = x^2$ and then along some other line or curve. SHOW WORK.

2) Verify Clairaut's theorem ($u_{xy} = u_{yx}$) for $u = x \sin(x + 2y)$