

1. (20 points) Give the ϵ - δ definition of

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

for a function f defined in an open neighborhood of (a,b) with range \mathbf{R} .

You must clearly declare all variables, hypotheses, and conclusions.

2. Let $f(x,y) = x^6 + y^3 + 6x - 12y + 7$.

- (a) (20 points) Find all points (a,b) such that $f_x(a,b) = 0 = f_y(a,b)$
(b) (20 points) With the points you found above, compute $(f_{xx}f_{yy} - f_{xy}f_{yx})(a,b)$.