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

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

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) (10 points) Find all points (a,b) such that $f_x(a,b) = 0 = f_y(a,b)$
   (b) (10 points) With the points you found above, compute $(f_{xx}f_{yy} - f_{xy}f_{yx})(a,b)$.

3. (20 points) Find the equation of the tangent plane to $f(x,y) = \ln(2x+y)$ at $(-1,3)$. You must show work.