

1. For each of the following limits either compute its value, or show that it does not exist

(a)  $\lim_{(x,y) \rightarrow (2,3)} \frac{x^2 + 2y^2}{x^2 - y + 1}$

(b)  $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2 + 3y^2}{x^2 + y^2}$

2. If  $f(x,y) = xe^{-xy} + \sin x$  compute the following:

(a)  $\frac{\partial f}{\partial x} =$

(b)  $\frac{\partial^2 f}{\partial y \partial x} =$