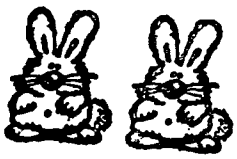

Calculus IV Quiz 1 Fall 1999 8/30/99

1. State the definition of the partial derivative of a function f(x,y) with respect to x.

$$\lim_{h \to 0} \frac{f(x+h, y) - f(x, y)}{h}$$

2. Find the value of $\lim_{(x,y)\to(0,0)} \frac{x-y}{\sqrt{x^2+y^2}}$ if it exists, or show that it does not exist.

$y=0$: $\lim_{(x,0)\to(0,0)} \frac{x-0}{\sqrt{x^2+0^2}} = \lim_{x\to 0} \frac{x}{\sqrt{x^2}}$ does not exist

$y=x$: $\lim_{(x,x)\to(0,0)} \frac{x-x}{\sqrt{x^2+x^2}} = \lim_{x\to 0} \frac{0}{\sqrt{2x^2}} = 0$

$x=0$: $\lim_{(0,y)\to(0,0)} \frac{0-y}{\sqrt{0^2+y^2}} = \lim_{y\to 0} \frac{-y}{\sqrt{y^2}}$ does not exist

Great