Quiz 2 Calc IV (Math2443-002) 6/6/2002

Each problem is worth 5 points. For full credit indicate clearly how you reached your answer.

1. Find $\displaystyle\lim_{(x,y)\to(0,0)} \frac{(x+y)^2}{x^2+y^2}$, or show that it does not exist.

$x=0$

$$\lim_{(0,y)} \frac{(0+y)^2}{0+y^2} = \frac{y^2}{y^2} = 1$$

$y=x$

$$\lim_{y=x} \frac{(x+x)^2}{x^2+x^2} = \frac{(2x)^2}{2x^2} = \frac{4x^2}{2x^2} = 2$$

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$1 \neq 2$, so the limit does not exist.

[redacted]

2. If $f(x,y) = xy^2 - e^x + \cos(xy)$, find f_x and f_y.

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$f_x(x,y) = y^2 - e^x + (-\sin(xy)y)$ { Assume all y are constants)

$f_y(x,y) = 2xy - 0 + (-\sin(xy)x)$ { Assume all x are constants)

e^x is a number in original because x is constant. Deriv. of constant is 0

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

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